MARINE REVIEW

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CONVERTED YACHTS.

VESSELS OF THE UNITED STATES NAVAL AUXILIARY FLEET WHICH ARE CREDITED WITH GOOD SERVICE AND ARE FORERUNNERS OF A NEW TYPE.

Vessels improvised for service in the United States navy during the recent war and the manner in which they met the exactions of the work imposed have been the subject of wide and varied discussion among naval officers, ship builders and naval architects, and from the results already deduced it is safe to say that a new appreciation will be gained of the type and character of ships needed in such emergencies. An instance in which this is particularly true is afforded by the converted steam yachts of the auxiliary navy, and the consideration of the subject at the recent New York meeting of the Society of Naval Architects and Marine Engineers was a sufficient demonstration that everybody concerned is likely to find many things disclosed by the light which has been turned on. Moreover it is already apparent that the yachts in their transformed form are the forerunners of a new type of vessel that is bound sooner or later to find a permanent place in the United States navy and the navies of the world.

The Review presents as a supplement to this issue illustrations of several of the principal steam yachts utilized for auxiliary service. The Mayflower, formerly the yacht of the same name, was purchased from the estate of Ogden Goelet. She was designed by G. L. Watson and built by the Clydebank Engine & Steamship Co., Clydebank, Scotland, in 1896. She is a steel vessel, brigantine rig and 318 feet over all, 273 feet water line, 36 feet beam, 21 feet depth, 16½ feet draught and of 2,690 tons displacement. She has two twin-screw four cylinder engines, with cylinders 22½, 38 and two of 40 inches by 27 inches stroke; two Scotch boilers, 17 feet 6 inches in diameter. She made on trial 16.75 knots. Her coal bunker capacity is 584 tons. She was converted into an auxiliary naval vessel at the Brooklyn navy yard, and carried two 5-inch, rapid-fire guns, twelve 6-pounders four Colts and two 18-inch torpedo tubes, together with a complement of nine officers and 152 men.

The Hist, formerly the yacht Thespia, was owned by David Dows, jr., and was built by the Wm. Cramp & Sons Ship & Engine Building Co. in 1895. She is steel, schooner-rigged, 195 feet over all, 174 feet water line, 23 feet beam, 13 feet depth, 10 feet draught and of 472 tons displacement. Her engines have cylinders of 22 and 42 inches diameter by 24-inch stroke, and she has two boilers 11 feet in diameter. On trial she made a speed of 14½ knots, has a coal bunker capacity of 60 tons and carries when in commission one 3-pounder and four 1-pounders, with her yacht complement of four officers and eighteen men increased to five officers and fifty men.

The Hornet, formerly the yacht Alicia, is a schooner-rigged steel vessel, built for H. M. Flagler in 1890 by the Harlan & Hollingsworth Co. at Wilmington, Del. She is 180 feet over all, 160 feet on the water line, 24 feet beam, 13½ feet depth, 11 feet draught, 425 tons displacement, and has triple expansion engines with cylinders 17.28 and 42 inches by 22-inch stroke.

The Scorpion, which was formerly M. D. C. Borden's yacht Sovereign, was designed by J. Beavor Webb and built by the J. N. Robins Co., Brooklyn, N. Y., in 1896. She is of steel, schooner-rigged and 250½ feet over all, 210½ feet water line, 28 feet beam, 16 feet depth, 12 feet draught and 850 tons displacement; two triple expansion engines, with cylinders 15, 24 and 39 inches by 20 inches stroke, and Yarrow boilers. On trial she made 17.85 knots, and has 200 tons coal capacity and 17,000 gallons tank capacity. She was altered at the Brooklyn navy yard, where she was given an armament of four 5-inch rapid-firers, six 6-pounders and two Colts. Her peace complement of six officers and thirty-eight men was increased to ninety-two men.

The Gloucester is shown as she appeared when the steam yacht Corsair, owned by J. Pierpont Morgan, and in the second picture as she looked after receiving her armament at the Quintard Iron Works, New York. She is a steel, schooner-rigged vessel, designed by J. Beavor Webb and built by the Neafie & Levy Co., Philadelphia, in 1891. This vessel is 241 feet over all, 204 feet water line, 27 feet beam, 16½ feet depth, 13 feet draught and of 786 tons displacement; triple expansion engines with cylinders 21.33 and 54 inches by 30 inches stroke; two Scotch boilers. She made 17 knots on trial, has a coal capacity of 120 tons and a tank capacity of 22,000 gallons. Her armament consists of four 6-pounder and four 3-pounder rapid-firers and two Colts. Her peace complement was six officers and thirty-six men and this was increased to seven officers and eighty-four men.

The yacht Josephine, afterward the U. S. S. Vixen, was designed and built by Lewis Nixon at his Crescent Ship Yard in 1896 for P. A. B. Widener. She also is of steel and schooner-rigged, and is 225 feet over all, 183 feet on the water line, 28 feet beam, 14 feet depth and 11 feet draught. Her engines are of the triple expansion type with cylinders 18.27 and 42 inches by 28-inch stroke.

The yacht Stranger retained the same name after she was converted at the Brooklyn navy yard and given an armament of one 14-pounder, two 6-pounders and two 1-pounders, her complement being increased meanwhile from four officers and sixteen men to six officers and forty-seven men. The Stranger, which was owned by Mrs. George Lewis, was built by the Cramps in 1880 and is an iron vessel, schooner-rigged, 190 feet over all, 173 feet on the water line, 24 feet beam, 11 feet depth, 10 feet draught; compound engines 24 and 44 inches by 24-inch stroke. Her speed on trial was 14 knots, bunker capacity 50 tons and tank capacity 3,000 tons.

The illustrations were presented by Mr. William P. Stephens with a paper read at the recent meeting of the Society of Naval Architects and Marine Engineers, and for the courtesy of permission to reproduce them The Review is indebted to Secretary F. P. Bowles of that organization.

ADDITIONAL ORDERS FOR LAKE SHIP YARDS.

It has been understood for some time past that Pickands, Mather & Co. of Cleveland, representing the Minnesota Steamship Co., were figuring on the construction of at least two modern steel freighters, a steamer and tow barge, and that the orders would very probably be placed with the Chicago Ship Building Co. and American Steel Barge Co., the steamer going to the Chicago concern and the barge to the West Superior yard. Both are to be vessels of the largest type, about 430 feet keel. Plans for the steamer provide for a hull of about the dimensions of the Superior City and for quadruple expansion engines and Babcock & Wilcox water tube boilers. The barge would be about the size of the Bessemer company's barge John Fritz. The matter of placing this order has hung off so long, however, that there is some doubt regarding the building of the vessels.

"I have often wondered," says Secretary A. L. Stone of the Nicola & Stone Lumber Co., Cleveland, "why ship builders on the lakes, or at least such of them as are still engaged in building wooden vessels, have not given attention of late to the use of Pacific coast fir, which is not given the credit due it for excellent wearing qualities and its adaptability where long lengths are required; where stock is required almost entirely free from sap and any but small sound pine knots, and where long straight-grain pieces are desired, especially for decking. For heavy bunkers and long stringers and timbers there is nothing that can touch it. It may be had in sizes up to 24 by 24 inches, 110 feet long, dressed on four sides. In tensile strength it is said to exceed the best Ohio white oak and certainly the best long-leaf or Georgia yellow pine. The day is not far distant when its qualities will be appreciated on the lakes. An instance that may be cited is an order we received not long ago from the Cleveland Ship Building Co. for 100,000 feet of heavy fir timbers for the bottom of the dock at Lorain, O. These timbers were 12 by 18 inches and 64 feet long, a size practically unobtainable in white pine, oak or yellow pine, and certainly unobtainable for a rush order. We took the bill and had it all on cars and car numbers in the hands of the Cleveland Ship Building Co. in about two weeks from the date of order, and the ship building company had the timber in place in the bottom of their Lorain dock in an incredibly short period thereafter."

The steel steamer building at the Lorain yard of the Cleveland Ship Building Co. for the Wilson Transit Co. of Cleveland will have a keel length of 444 feet with 50 feet beam, 29 feet depth and fourteen hatches spaced 24 feet between centers. She will certainly be a representative ore carrier as regards dimensions and facilities in a great number of big hatches for rapid loading and discharge of cargo. Engines will be triple expansion and boilers of Scotch type.

NAVAL OFFICERS AT SHIP YARDS.

Orders have been issued from the navy department within the past few days transferring a number of officers to various private ship yards for the inspection of work under construction for the government. Capt. R. P. Leary is ordered to duty as inspector of the torpedo boats Blakely and De Long at the works of The George Lawley & Son Corporation, East Boston, Mass., and the destroyers Lawrence and Mac Donough at the Fore River Engine Works, Weymouth, Mass. Lieut. L. H. Chandler is made inspector of the torpedo boats Dahlgreen, Craven, Bagley, Barney and Biddle and training ship Chesapeake at the Bath Iron Works. Lieut. F. R. Brainard goes to the yard of Neafie & Levy Co., Philadelphia, to watch progress on the destroyers Bainbridge, Barry and Chauncey. Lieut. P. Andrews relieves Lieut. P. J. Werlich at the Bethlehem Iron Co.'s works. Lieut. E. F. Qualtrough is ordered to duty as inspector of equipment of the United States vessels under construction at Lewis Nixon's Crescent Ship Yard, Elizabethport, N. J.

Capt. A. B. Davis of the United States revenue cutter service, who is well known to vessel men in all parts of the lakes on account of his connection with Sault river navigation rules and patrol duty on the river, is again on the lakes in command of a revenue cutter, the Morrill, which he has just brought up from the coast. Although not too large to pass through canals of the St. Lawrence route, the Morrill is a vessel entirely suited to the lake service, and especially the Sault river patrol duty. She was built some ten or twelve years ago, but is still practically as good as new, as the hull is of steel, honestly constructed by one of the most reliable ship building concerns in the country, the Pusey & Jones Co. of Wilmington, Del., and new boilers were put in only a short time ago. Engines are of the compound type. The ship has an electric light plant, and it is the intention of the revenue cutter officials to put in steam steering gear and steam windlass when she is laid up at Milwaukee for the winter after closing up affairs on the St. Mary's river. A turtle-back deck forward and other improvements will also be made on the vessel at Milwaukee.

The Chicago Nautical School is about to reopen its annual term, and the prospects are that there will be a very much larger attendance than heretofore, divided pretty equally between naval militia, yachtsmen and lake vessel captains and mates. Heretofore the lake vessel captains and mates have been the fewer in number, but the "Master's Manual," distributed by the Great Lakes Register of Chicago during the past year has had the effect of waking up many captains and others to the fact that the course is eminently practical, and they are now writing to Lieut. Wilson from all over the lakes in regard to his school. The McCurdy prizes will be again offered to those captains and mates showing most proficiency in the examinations to be held next spring.

TORPEDO BOAT FARRAGUT.

THIS CRAFT, RECENTLY COMPLETED BY THE UNION IRON WORKS, SAN FRANCISCO, IS AT PRESENT THE MOST DISCUSSED VESSEL IN THE U. S. TORPEDO BOAT FLOTILLA.

Undue significance has been attached in some quarters to the failure of the torpedo boat Farragut, the first of the 30-knot type of boats constructed for the United States, to maintain that speed during the entire period of her governmental trial. The failure of excessive speed vessels to attain the speeds contracted for is a matter of no uncommon occurence in foreign navies and is, indeed, generally regarded by all the better informed men identified with naval or ship building interests as the inevitable result of the unreasoning demand for maximum speed in which the navies of the world have indulged during recent years.

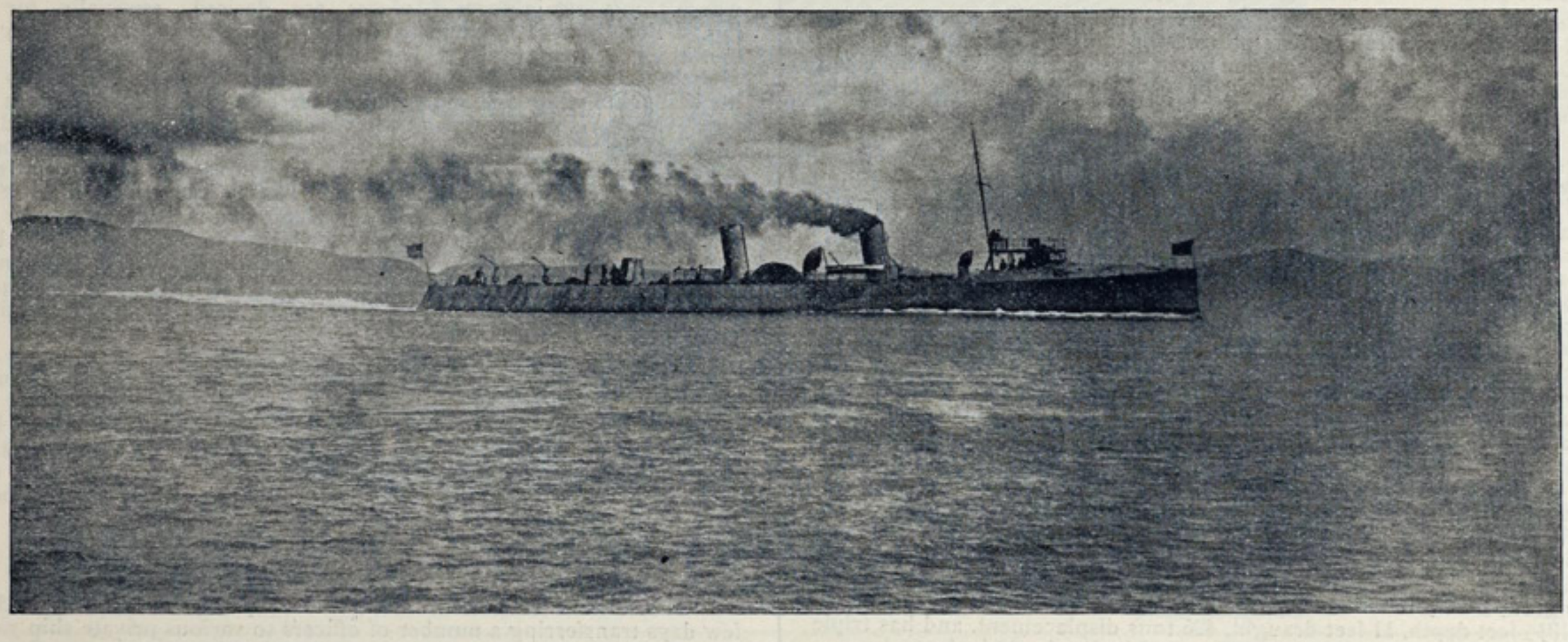
It is simple justice to the builders of the Farragut, the Union Iron Works, San Francisco, to say that the recent trial was made under the most unfavorable circumstances. On a previous attempt the Farragut maintained for 40 minutes a speed in excess of 31 knots, but a slight break in the machinery necessitated a postponement of the trial. On the later day on which the speed course was finally successfully covered a heavy sea was running and the greater part of the trip was made in the face of a strong head wind. Even under these conditions the boat made on this part of the course a speed of 29.73 knots and when running with the wind easily attained more than 30 knots. The trial board was obliged, however, to give 29.73 knots as the official speed. The builders of the boat thought, not unnaturally perhaps, that under the circumstances the government would accept the boat without a further trial, but it seems that the navy department has discovered that under the contract stipulations it is necessary to refuse to do so, and the trial will accordingly have to be repeated.

In view of the fact that it is a common occurence in European navies for a torpedo boat destroyer to make 30 knots on trial and when placed in service to fail to exceed 26 knots, it is perhaps to be expected that the layman might display some skepticism regarding the Farragut, but it can readily be realized that this is unjust when consideration is given to the previous ship-building record of the Union Iron Works and particularly the performance of the Oregon, in exceeding contract speed under adverse conditions. Moreover, an illustration of the results to be expected from the American method of building boats is found in the recent performance of the torpedo boat Du Pont, built in 1897 by the Herreshoff Mfg. Co. of Bristol, R. I. During torpedo boat practice in Narragansett bay last week the DuPont's starboard engine made 401 revolutions per minute and the port engine 403 revolutions, and this with only two of her boilers in use. A speed exceeding 30 knots was attained, whereas her contract speed was but 27½ knots for three boilers.

With the exception of the Stringham, now building at the yard of the Harlan & Hollingsworth Co., Wilmington Del., the Farragut is the largest torpedo boat building for the United States government, and she not only represents the highest type of construction but is believed to equal in speed and general effectiveness the best of this class of vessels built for foreign navies. The Farragut was authorized under an act passed June 10, 1896; the contract was signed Oct. 5, 1896; the keel laid July 23, 1897; and she was launched July 16, 1898. She is 213 feet 6 inches in length, 20 feet 7¾ inches beam, 6 feet draught and 273 tons displacement. Power for propulsion is furnished by twin-screw vertical triple expansion engines with cylinders 20, 29, 30 and 30 inches by 18 inches stroke. She is fitted with Thornycroft boilers, has 5,600 indicated horse power, 7 tons per inch immersion at normal draught, and a bunker capacity of 76 tons. The Farragut has two 18-inch Whitehead torpedo tubes and an armament consisting of four 6 pounder rapid fire guns. The contract price for her construction was $227,500.

In many of the accounts regarding the boat which have been published the Farragut has been classed as a torpedo boat destroyer, and indeed Brassey places the Porter, Du Pont and Rowan also in that category, but the official records of the navy department class the vessel as a torpedo boat, listing as destroyers only the new vessels recently contracted for. It may be of interest to note that the Farragut is several tons larger than either the Furor or Pluton, the Spanish vessels destroyed at Santiago.

The picture herewith presented is from a photo kindly furnished to the Review by Mr. Irving M. Scott, vice president and general manager of the Union Iron Works, and was taken when the vessel was making a speed of 31.76 knots. The United States naval vessels which have preceded the Farragut from the yard of the Union Iron Works are the Charleston, Olympia, Oregon, San Francisco, Monterey, Marietta and Wheeling.



TORPEDO BOAT FARRAGUT STEAMING 31.76 KNOTS—BUILT BY THE UNION IRON WORKS, SAN FRANCISCO.

BUSY NAVAL ARCHITECTS.

It is doubtful if naval architects with headquarters in New York have ever before been so crowded with work. Almost all of them have recently found the necessity of increasing their forces of draftsmen. Horace See, whose office is at 1 Broadway, is finishing up the plans for the Morgan liners, now under construction by the Newport News Ship Building & Dry Dock Co. As stated elsewhere, Gardner & Cox, 1 Broadway, have in preparation plans for four steam yachts, one large schooner-rigged yacht and several smaller craft. S. S. Jordan, formerly with the Chicago Ship Building Co., who opened offices in the Bowling Green building at 11 Broadway not long ago, already has a number of clients. Gustav Hillman, whose office is at 470 Greene avenue, near Nostrand, and who has designed some of the finest yachts in the country, has several commissions, about which he is preserving strict secrecy, and this is also true of H. C. Wintringham with offices at 1205 Havemeyer building. A. Cary Smith of 35 Nassau street, designer of the Richard Peck and City of Lowell, has the new boat for the New Haven Steamboat Co. and J. Beavor-Webb, 11 Broadway, is kept well occupied superintending the construction of the new yacht for J. Pierpont Morgan. C. D. Mosher of 1 Broadway, designer of the Ellide, is about to introduce an innovation for naval architects in the issuance of an elaborate illustrated catalogue, containing descriptions of some of the speedy vessels which he has designed, and dealing also with their performances.

MR. C. A. GRISCOM FAVORS MAIL SUBSIDIES.

Mr. Clement A. Griscom, president of the International Navagation Co., who is a member of the Philadelphia shipping committee appointed some time ago, and in which Senator Frye and Hanna are also active, when asked recently by a representative of the Marine Review as to the progress made by the body said: "Our work has, of course, been interrupted because Senator Frye found it necessary to go to Paris on the Spanish war commission, but nevertheless things have become so formulated that we shall be ready to report early in the next session of congress. We have said little about our consideration of this subject, simply because we do not wish to provoke a discussion of the matter until we believe the opportune time has arrived. I will say, however, that we have weighed very carefully the arguments in favor of the system of mileage subsidies maintained by the French and Italian governments and that may be the system recommended. I think our government should continue and perhaps extend its system of reasonable mail subsidies."

The statement that the new floating drydock of the Vulcan company of Stettin is the largest in the world, appears to be untrue. This distinction, it is said, belongs to a dock built by Messrs. Blohm & Voss of Hamburg, which has been in use in their yard for nearly two years. The difference in size of the two docks may be seen from the following figures. Those relating to the Stettin dock are in parentheses so that they may be readily compared with those of the Blohm & Voss dock, which are as follows: Length, 560 feet (510 feet); width 88 feet (82 feet); depth 30 feet (24 feet); maximum lifting power, 17,500 tons (12,000 tons); time required for lifting maximum load, 1 hour (2¼ hours).

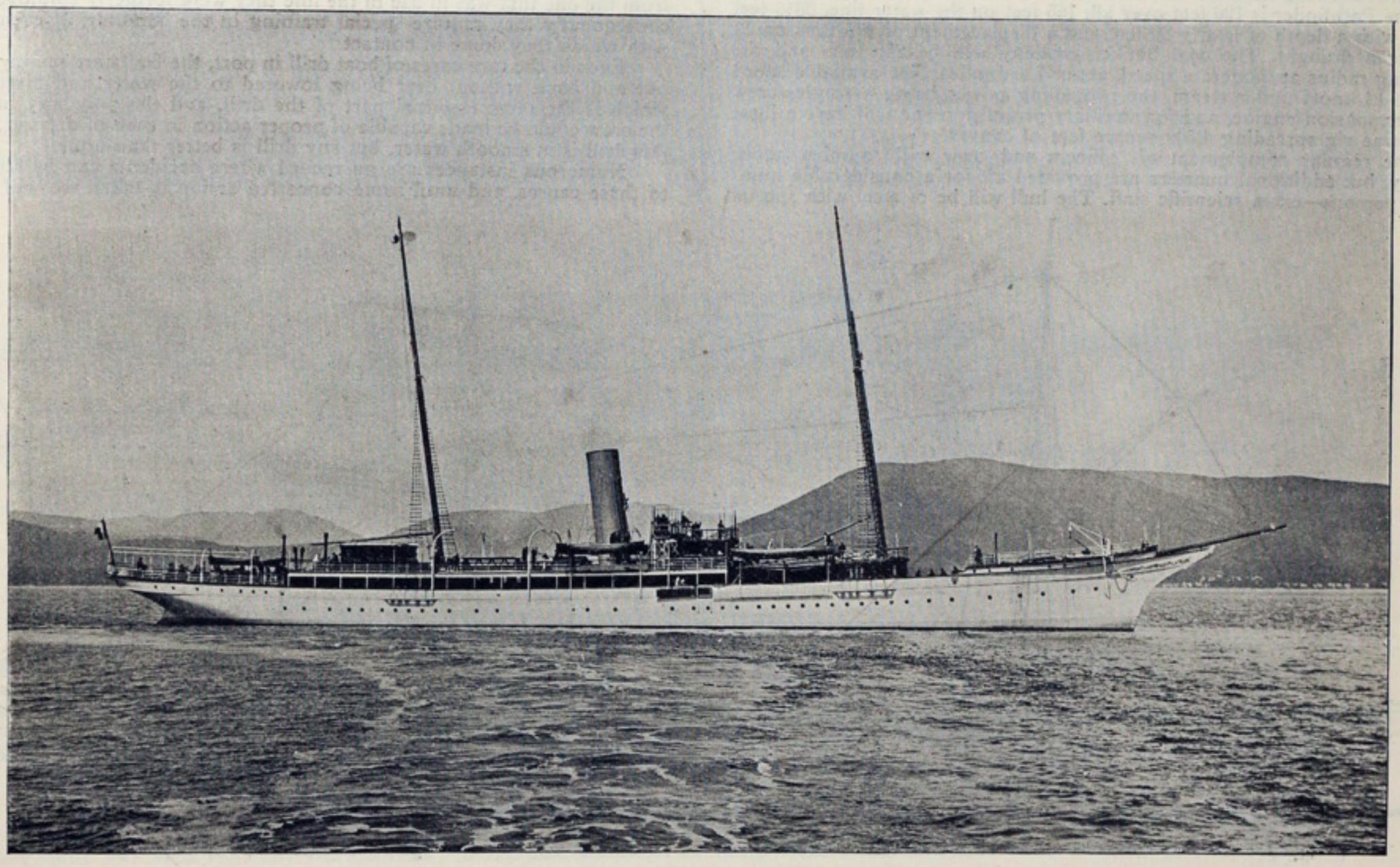
A contract for a new steamer for the Prince Edward Island route has been awarded to Gourlay Bros., Dundee, Scotland. She will be 325 feet over all, 32 feet beam and 20 feet depth and will have triple expansion engines.

ROTHSCHILD YACHT.

FINEST PLEASURE CRAFT IN EUROPE—DESIGNED BY G. L. WATSON & CO. OF GLASGOW AND BUILT BY THE FAIRFIELD SHIP BUILDING CO.

Through the courtesy of G. L. Watson & Co., naval architects of Glasgow, Scotland, the Review is enabled to present herewith a picture from the only photo of the steam yacht Atmah taken before she left the yard of her builders, the Fairfield Ship Building Co. at Govan, Scotland, for delivery to her owner Baron Edmond de Rothschild. The Atmah enjoys the distinction of being the largest private yacht in European waters and is only exceeded in size by two American yachts, the Vanderbilt yacht Valiant, and the Nahma, owned by Robert Goelet.

The Atmah is 280 feet on the load water line, 34 feet 2 inches beam, 21 feet 3 inches depth and has a tonnage (Thames measurement) of 1,650 tons. She has two sets of triple expansion engines, each having cylinders 20½, 34 and 37 inches (two of the diameter last named) by a common stroke of 27 inches. Steam is supplied from two return-tube boilers at a working pressure of 160 pounds. Novel features embodied in the construction of this yacht are the result of a combination of the ideas of Watson & Co., the designers, and Baron de Rothschild, who gave his personal attention to the plans. A shade deck is provided for two-thirds



STEAM YACHT ATMAH DESIGNED BY G. L. WATSON & CO. FOR BARON EDMOND DE ROTHSCHILD.

the length of the boat. On this are two deck houses, the forward one used for navigating purposes and the after one containing a large smoking room. There is a long range of houses on the main deck. Aft of the dining room are the officers quarters and aft of these again and under a raised quarter deck are the quarters for the crew. Engines and boilers occupy the middle of the ship and immediately forward of these are the private apartments of the owner. There is a large deck saloon, occupying the entire fore end of the deck house, and from the after end of it a staircase leads to apartments on the cabin deck. The fore end of the vessel is devoted to five staterooms for guests. On the main deck and under a raised forecastle are rooms for the carpenter, boatswain and quartermasters, together with lamp rooms, etc.

During trials of the yacht last summer all on board commented on the absolute smoothness and absence of vibration in the working of the engines, which are of the four-cylinder balanced type, fitted also by Watson & Co. in the Varuna, Mayflower and Nahma. The coal trials were not as conclusive in their demonstrations as might have been wished, owing to the fact that during the strike of the Welsh miners no fuel was obtainable save very inferior Scotch coal. Even with this disadvantage, the result was far from unsatisfactory, the coal per horse power per hour averaging 1.8 pounds, which would be equivalent probably to only a little over 1½ pounds of Welsh coal per indicated horse power per hour. On these trials the vessel was run at her probable cruising speed of 14¾ knots. On the speed trials a speed of 15¾ knots was maintained, a showing eminently satisfactory, in view of the fact that the Atmah was at the time carrying her full complement of fuel, water and stores, aggregating more than 500 tons.

The Russian government has ordered the construction at the Nevsky ship building yard, of twenty-three torpedo boat destroyers of the type of the Sokol, which is of nickel-steel and aluminium, having 240 tons displacement, and a speed of 30.28 knots

RECORD IN YACHT BUILDING.

THE ROACH SHIP YARD, CHESTER, PA., MAKES IT BY SECURING THE CONTRACT FOR ANOTHER STEEL TWIN-SCREW VESSEL FOR SEA SERVICE.

The exactions of modern steam yacht construction are such as to make it not only one of the forms of ship building requiring exceptional skill but a factor which has become generally recognizable as a branch of growing importance in the industry. These facts, together with recent circumstances—among others the attention drawn to steam yachts by their use in the United States auxiliary navy—serve to lend interest to the remarkable record in yacht building now being made by the Delaware River Iron Ship Building & Engine Works of Chester, Pa. This company has secured within the past few days a contract for another large pleasure craft, a twin-screw yacht for A. E. Tower of Poughkeepsie, N. Y., to be 160 feet in length. In addition to this latest order, the Roach yard is now building a 150-foot steam yacht for Richard Stevens; a 160-foot boat for Eugene Tompkins of Boston; and a 175-foot yacht for J. Gardner Cassatt of Philadelphia. It will be remembered also that it was only last summer that the Roach yard turned out the President's yacht Slyph and her sister boat, the Malay, built for Dr. Weld. There is no doubt that this constitutes a greater number of large steam yachts than has ever before been turned out by any ship building concern in America in an equal length of time. Credit for this accomplishment also redounds to Gardner & Cox, naval architects of 1 Broadway, New York, who designed all the six vessels mentioned.

The vessel to be built for Mr. Tower will be 160 feet on the water line, 23 feet beam and 10 feet draught and equipped with two four-cylinder engines capable of developing 2,000 horse power. Steam will be supplied from four Almy water tube boilers and forced draft will be provided on the ash pan principle. The vessel will be lighted by electricity, the electric plant including a powerful storage battery. The designed speed is 19 knots. The yacht will be a thorough sea going boat in every respect, as her owner desires to use her for Mediterranean cruises. The interior finish will be elaborate, the owner's quarters being in mahogany and the smoking room in English oak. Owner's quarters consisting of state, bath and dressing rooms are in the forward deck house; the after deck house has the dining saloon, smoking room and steward's pantry, which latter is a passageway connecting the dining room with the galley in the after end of the house. Below deck forward are guests' quarters, consisting of four staterooms, bath room and main saloon, while aft of the engine and boilers are bachelor quarters consisting of three state rooms and a bath room.

The Stevens yacht Aileen is in frame and will be completed in March, while the keels for both the Tompkins and Cassatt yachts were laid some time ago and that of the Tower boat will soon follow.

For a comfortable trip to New York take Pennsylvania No. 6, which leaves Union station daily at 1:40 p. m., and from Euclid avenue 1:50 p. m., arriving New York 7:43 next morning. Pullman's very best sleepers run through on this train without change. Supper is served in dining car. Note that the train stops at Euclid avenue station, saving the tedious ride down town to those living in the eastern part of the city. Phone main 1263 or east 513 for space and full information.

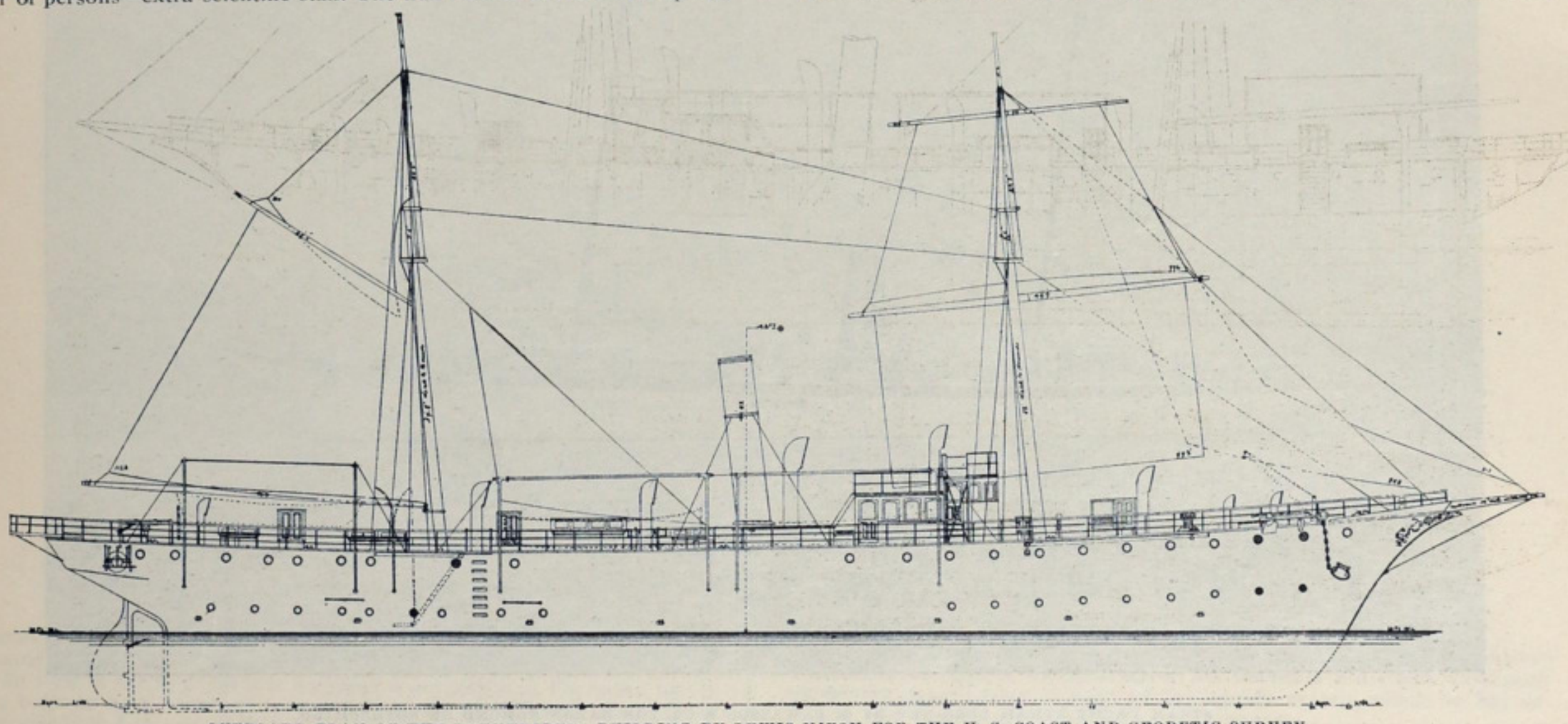
STEAMER PATHFINDER.

A VESSEL UNDER CONSTRUCTION BY LEWIS NIXON FOR THE COAST AND GEODETIC SURVEY.

There will be launched at the Crescent Ship Yard of Lewis Nixon at Elizabethport, N. J., on Dec. 7, a new steamer, to be christened Pathfinder, and which was designed by Naval Architect Frank Willis Grogan for the United States Coast and Geodetic Survey, of which Dr. Henry S. Pritchett is superintendent. The vessel will be the largest craft ever employed in that service and is especially intended for explorations in Alaska and the Aleutian islands. On such a vessel are needed extensive quarters, room for stores for a long season, great coal endurance, speed to overcome the currents sweeping through the passes and into the inlets of the district in which she is to be engaged, as well as appliances in the form of boats, motor launches, sounding apparatus and instruments sufficient to carry on at the same time different classes of work, such as hydrography, topography, triangulation, determination of latitude and longitude, base measurement, etc. The vessel should be able to resist ordinary ice pressure and have safety arrangements in case of striking a sunken rock or shoal, always a possibility in the prosecution of a survey in comparatively unknown waters. That this vessel will meet the above requirements will be evident from the following description:

The Pathfinder is 196 feet over all, 165 feet on the water line, 33½ feet beam, with a depth of nearly 20 feet and a displacement of 875 tons on 11 feet mean draught. The coal bunker capacity will be 250 tons and the steaming radius at moderate speed, about 7,000 miles. The available speed will be 12 knots under steam, the propelling power being a single-screw triple-expansion engine, and for auxiliary propulsion she will have a light brigantine rig spreading 4,500 square feet of canvas.

The regular complement of officers and crew will number about seventy, but additional quarters are provided aft for a considerable number of persons—extra scientific staff. The hull will be of steel with special strengthening and double plating forward at the water line, and will have seventeen water-tight compartments, the lower (or lop) decks being water-tight. A portion of the bottom will be double. The quarters for the crew will be commodious and fitted with lavatory, etc. Steam will be used for steering, hoisting boats, pumping and other purposes, and electricity will be employed for lighting the vessel throughout. There is ample room for provisions and other stores for a long cruise. There will be two large alco-vapor launches, two whaleboats, a cutter and a dingby, besides two large life rafts secured in readiness for immediate service in an emergency. Besides special apparatus for sounding, the vessel will be furnished with instruments of the best type for every kind of surveying work. The Pathfinder will be completed early next spring, after which she will be sent to the Pacific coast, probably by way of the Suez canal.



OUTBOARD PLAN OF THE PATHFINDER—BUILDING BY LEWIS NIXON FOR THE U. S. COAST AND GEODETIC SURVEY.

A rumor in circulation in the east is to the effect that Lewis Nixon, proprietor of the Crescent ship yard, Elizabeth, N. J., contemplates an enlargement of his plant and a considerable expenditure in improved equipment. Mr. Nixon leases the yard and this circumstance is said to constitute the only cause for any delay. In addition to the Pathfinder, now ready for launching, the Crescent yard has contracts with the government for three water boats, two torpedo boats and a monitor, and is figuring on several contracts for merchant vessels, so that consideration of some increase in the capacity of his yard would seem a natural sequence if not a necessity.

A naval architect in New York city who will not allow the use of his name has confided to his friends a claim that he is at work on an order for a dynamite cruiser, which, while of greater length than the Vesuvius, will carry two instead of three 15-inch dynamite guns. The air of mystery with which the matter has been veiled has induced some skepticism among naval architects who have heard of it.

STRONG HANDS TO DEAL WITH LIFE BOAT QUESTION.

Editor Marine Review:—I was pleased to note at the meeting of the Society of Naval Architects and Marine Engineers in this city last week that several of the naval constructors and ship builders, notably Lewis Nixon, manifested a thorough interest in the subject of life boat equipment. The Mohegan and La Bourgogne disasters have prompted the naval architects to make the subject of life boats and the devices for handling them one of first importance for their next meeting. There will be nothing done in this matter until the attention of the treasury department is most forcibly directed to the narrow lines within which the steamboat inspection service has been operating. The subject is a vital one. It concerns those most who are ignorant of the use and value of devices for handling life boats. So, naturally, it devolves upon those familiar with the subject to use their best efforts to arouse the apparent indifference of the party or parties having these matters in their control and supervision. This society, representing not only the navy but the ship building and ship owning interests of the entire country, should be equal to the task.

Many of our steamship lines willingly adopt all devices that add to the safety and comfort of their patrons, while others, for economical reasons, carelessness, or a lack of knowledge of the necessity of such appliances, do not adopt them. Devices for the purpose of lowering and disengaging boats are numerous and vary so in construction that it is impossible for sailors to become familiar with the use of all of them. Sailors going from one steamship line to another find the boat-lowering gear entirely different from the one that was in use in the line they were formerly employed with, consequently they require special training in the handling of each device with which they come in contact.

Even in the rare cases of boat drill in port, the boats are merely swung out and back without ever being lowered to the water and disengaged, which is the most essential part of the drill, and the only way in which the crew could be made capable of proper action in time of disaster. Even this drill is in smooth water, but any drill is better than none.

Numerous instances are on record where accidents can be attributed to these causes, and until some concerted action is taken we will have a repetition again and again of loss of life in the Mohegan and La Bourgogne disasters, which were greatly due to the inability to lower and detach the boats.

By reference to the United States Revised Statutes, as suggested by Mr. Wanstall in a recent communication to the New York Herald (issue of Oct. 29), it will be seen that they are most specific regarding these matters. Why are they not enforced? Are there any legitimate reasons for their non-enforcement? If they are impractical why are they not repealed? Why is not somthing done in this matter?

MEMBER S. N. A. & M. E.

New York, Nov. 16, 1898.

HOLLAND SUBMARINE BOAT TEST.

The Holland submarine torpedo boat was last week subjected to an official test in the lower bay, New York, before the naval board of inspection and survey, which was detailed to report upon the vessel in view of its contemplated purchase by the government. The board was composed of Capt. Frederick Rogers, Commander William H. Emory, Lieut. Nathan Sargent and Capt. Robley D. Evans. The test consisted of the discharge of an 11-foot torpedo in the harbor, and then, after the vessel had put to sea, diving, plunging under and out of the water, running at full speed under the surface and reversing suddenly while submerged, and was declared at its conclusion to have been eminently satisfactory. The members of the board, with other naval officers and the owners of the Holland boat, witnessed the trial from a tug. In the party were Chief Engineer John Lowe, U. S. N., and Lewis Nixon. Several changes had been made in the vessel since its former trials, although the steel masts fore and aft were retained to make it better discernable. Lieut. Sargent and Chief Engineer Lowe superintended the maneuvers and operated the vessel themselves. A torpedo was discharged when the mouth of the tube was 5 feet under water, and the torpedo ran for 400 yards before its propellers ceased to revolve.

VESSEL COSTS.

INTERESTING DATA EMBODIED IN THE REPORT OF CHIEF CONSTRUCTOR HICHBORN-COMBUSTIBLE MATERIAL ON BOARD SHIP-REPAIRS AND CHANGES.

The annual report of Philip Hichborn, chief of the bureau of construction and repair of the navy department, advance sheets of which were reviewed in these columns two weeks ago, is at hand and proves to be an even more valuable document than was indicated by the summary previously mentioned. The report will be especially appreciated for the magnificent tables of vessels of the United States navy, absolutely complete to date, and which in addition to all the usual data and dimensions give the date of launch and completion, the name of the builder and much other information which has not heretofore been obtainable, even in the navy register.

The six composite gunboats, Annapolis, Vicksburg, Newport, Wheeling, Marietta and Princeton, which have now been completed and accepted, being of the type advocated by Chief Hichborn, he very naturally takes some satisfaction in directing attention to the small cost on account of changes in the vessels. The contract price of the gunboats ranged from $219,000 in the case of the Wheeling to $230,000 for the Princeton; net increase in cost on account of changes from $1,585.93 to $8,442.60; percentage of increase ranging from .691 to 3.670. That portion of the report relative to the vessels surveyed shows that the repairs on the Dolphin cost over $44,000; those on the Lancaster, $26,775; and on the Philadelphia, turned out at the Mare Island navy yard last February, $153,010.

The probable date of completion of the battleships Kearsarge and Kentucky is given as August 1899; Illinois, April 1, 1900; Alabama, Sept. 24, 1899; Wisconsin, Sept. 1, 1899. The date fixed in the case of the three latter battleships is based on the supposition that all armor will be delivered without delay. As an illustration of the extent of the work accomplished in converting auxiliary vessels, it is stated that the cost of alterations in construction and repair on the hospital ship Solace required three weeks and the expenditure of $51,000; for the repair ship Vulcan, six weeks and $26,000, and for the distilling ship Iris, ten weeks and $80,000.

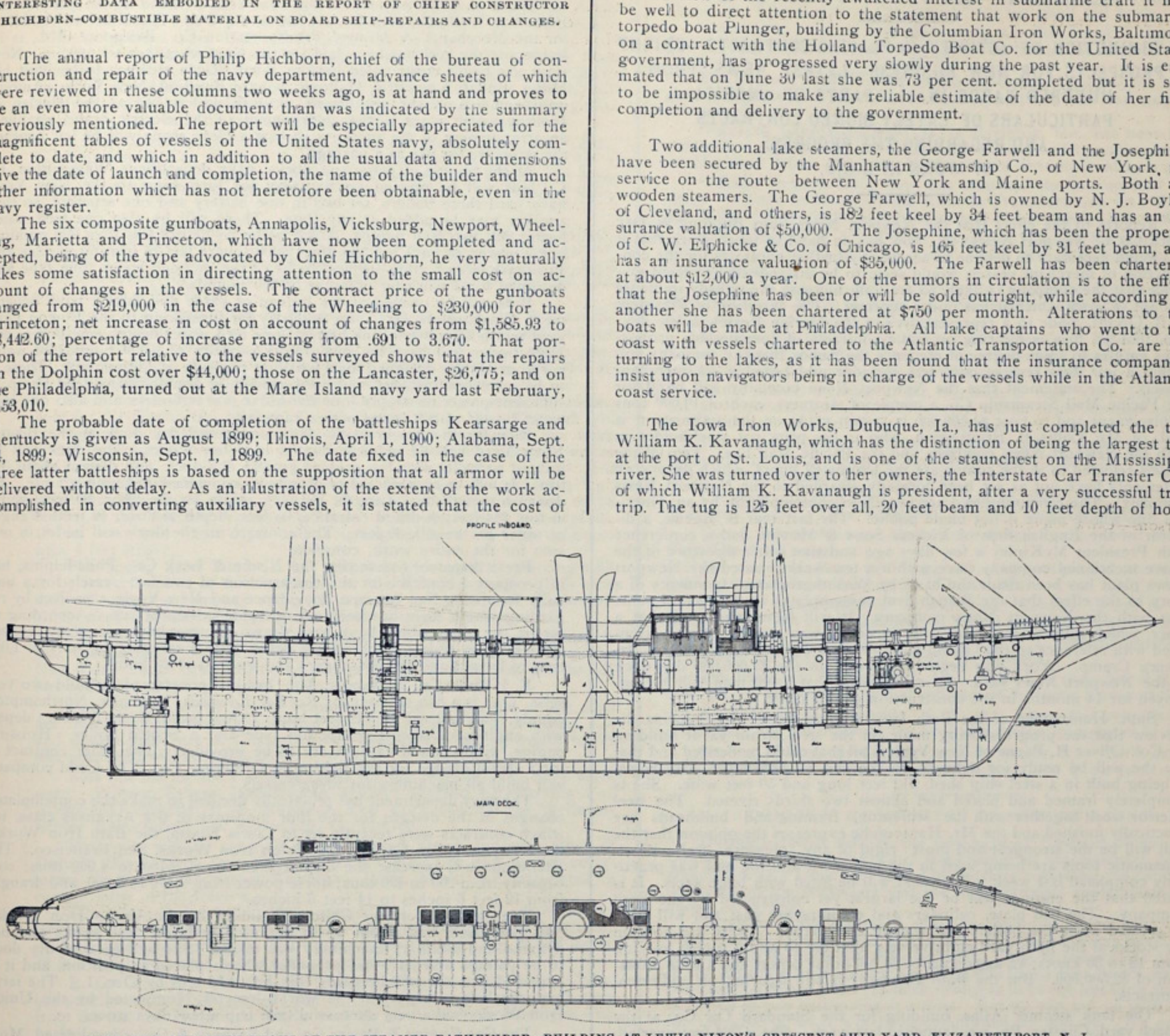
The comments of the chief constructor relative to the use of combustible material in the construction of war vessels have already been reproduced in the Review, but there is appended in the report an interesting tabular statement of the vessels which now have woodwork wholly or in part treated so as to be non-inflammable. The Iowa has all joiner work above the protective deck fireproofed; the Brooklyn about half of the joiner work above the protective deck thus treated, and the Kearsarge, Kentucky, Alabama, Illinois and Wisconsin all joiner work treated for fireproofing. This is also true of the torpedo boats Rowan, Winslow, Rodgers, Foote, Morris, Talbot, Gwin, Mackenzie and McKee. The vessels, the decks and joiner work of which have been given this fireproof protection include the Miantanomah, Chicago, Wilmington, Helena, Nashville, Annapolis, Marietta, Newport, Princeton, Vicksburg and Wheeling.

A tribute is paid to the corps of naval constructors in the following language: "The bureau ventures to point out the fact that the immense amount of work carried out under its cognizance during the past six or eight months has been accomplished without any increase in the personnel of the construction corps beyond the placing on active duty of three retired officers. As much of the work was carried on continuously, day and night, with careful supervision at all times, it must be apparent that such results could be obtained only by the most faithful and unremitting attention to duty on the part of naval constructors." Under the heading "Tonnage of Vessels of the Navy" occurs the following recommendation: "The laws regarding tonnage can not, as they stand, be readily applied to vessels of war, except for machinery-space deductions. In view of the possible importance of this matter in the case of vessels using canals, or becoming in any manner liable to dues based upon tonnage, it is recommended that an interpretation of the tonnage law as applied to vessels of war be requested, and that after such an interpretation is made each of the vessels of the regular navy be measured for tonnage; and that vessels building be measured officially by the proper authorities while in frame."

In view of the recently awakened interest in submarine craft it may be well to direct attention to the statement that work on the submarine torpedo boat Plunger, building by the Columbian Iron Works, Baltimore, on a contract with the Holland Torpedo Boat Co. for the United States government, has progressed very slowly during the past year. It is estimated that on June 30 last she was 73 per cent. completed but it is said to be impossible to make any reliable estimate of the date of her final completion and delivery to the government.

Two additional lake steamers, the George Farwell and the Josephine, have been secured by the Manhattan Steamship Co., of New York, for service on the route between New York and Maine ports. Both are wooden steamers. The George Farwell, which is owned by N. J. Boylan of Cleveland, and others, is 182 feet keel by 34 feet beam and has an insurance valuation of $50,000. The Josephine, which has been the property of C. W. Elphicke & Co. of Chicago, is 165 feet keel by 31 feet beam, and has an insurance valuation of $35,000. The Farwell has been chartered at about $12,000 a year. One of the rumors in circulation is to the effect that the Josephine has been or will be sold outright, while according to another she has been chartered at $750 per month. Alterations to the boats will be made at Philadelphia. All lake captains who went to the coast with vessels chartered to the Atlantic Transportation Co. are returning to the lakes, as it has been found that the insurance companies insist upon navigators being in charge of the vessels while in the Atlantic coast service.

The Iowa Iron Works, Dubuque, Ia., has just completed the tug William K. Kavanaugh, which has the distinction of being the largest tug at the port of St. Louis, and is one of the staunchest on the Mississippi river. She was turned over to her owners, the Interstate Car Transfer Co., of which William K. Kavanaugh is president, after a very successful trial trip. The tug is 125 feet over all, 20 feet beam and 10 feet depth of hold. She is built entirely of steel, with ¾-inch plates at the stem and ⅜-inch plate at the stern, support being furnished by three breast hooks on each side, which run to a point on the stern and will afford protection against ice. The compound engine with which she is fitted was furnished by J. H. McConnell of the Marietta Manufacturing Co., Marietta, O. The cylinders are 22 and 38 inches by 26-inch stroke. Her boiler is of the Scotch marine type, 11 feet in diameter and with a Morrison furnace. The tug has steam steering gear and complete modern equipment.



OUTBOARD AND DECK PLANS OF THE STEAMER PATHFINDER—BUILDING AT LEWIS NIXON'S CRESCENT SHIP YARD, ELIZABETHPORT, N. J.

Mr. Mathew Morton, president of the Morton Manufacturing Co. of Muskegon, Mich., has just returned from a three months' European tour, during which he secured a number of handsome contracts for machinery, his firm making a specialty of ship and engine building tools. Among other orders which he booked was one from John Brown & Co. of Sheffield for a shaper to weigh from 16 to 20 tons. It is to be used for planing armor plate and other work of exceptional size.

The navy department this week formally signed contracts with the W. R. Trigg Company of Richmond, Va., for the construction of three torpedo boats and two destroyers. The award of these vessels was made at the time the other vessels of their class were apportioned, but objection was raised on the ground that the Trigg company had not a plant capable of turning out the work. An investigation was made and the Richmond company proved conclusively to the government their ability to construct the five vessels in accordance with the plans.

Wolff & Zwicker, Portland, Ore., builders of the torpedo boat Davis, in notifying the navy department that the damage caused by the recent accident has been repaired, and that the vessel is ready for another trial, stated that when the accident occurred the boilers were under a steam pressure of only 250 pounds, whereas in the test they had been subjected to a water pressure of 360 pounds.

BUSY SHIP YARDS.

NO DIMINUTION OF ACTIVITY IN PLACING CONTRACTS—BRIGHT PROSPECTS FOR NEW BUSINESS—LATEST NEWS FROM A HUNDRED YARDS IN ALL PARTS OF AMERICA—PARTICULARS OF LATELY SIGNED CONTRACTS AND REGARDING THE PROGRESS OF WORK IN HAND.

Reports to the effect that the Newport News Ship Building & Dry Dock Co. of Newport News, Va., now has on hand so much work that it was found necessary to decline to accept any further contracts for the construction of merchant vessels would seem to be discredited by recent evidence that the company is likely to ere long increase the already immense amount of work which it has under contract. The assertion of President C. B. Orcutt, made to a representative of the Marine Review a few days ago, that his firm is figuring on some contracts of considerable proportions entitles to some degree of credence the rumor that the company will within a few days receive contracts for four and possibly six merchant vessels. The statement that the Newport News company will build for the Pacific Mail Steamship Co. a couple of steamers, each of 10,000 tons displacement and to cost $1,500,000 is again made on the authority it is said, of Mr. Collis P. Huntington, who is the principal stockholder in both the Newport News company and the Pacific Mail line. Two of the vessels referred to in the rumor are the Cromwell liners, which despite all statements have not as yet been formally awarded to the Newport News company. The remaining two are vessels in contemplation by an American line whose name is not made public. The fact that S. Loewe, a director of the English firm of Vickers Sons & Maxim, had a conference with President McKinley a few days ago and that other directors of the above mentioned company have within a few weeks visited the Newport News plant has been made the basis by Washington correspondents of a story to the effect that the British firm contemplates an alliance of some sort with the Newport News company. It will be remembered that a story, which differed from this only in detail, was some time ago circulated with reference to the Cramp yard and was vigorously denied by Mr. Henry Cramp. Work was begun last week on the $1,000,000 dry dock at the Newport News yard. It is estimated that 1,000 men will be employed for 14 months in the construction of this dock.

Supt. Hanscombe of the Bath Iron Works, Bath, Me., informs the Review that the progress being made on the steel steam yacht building for Col. Oliver H. Payne of New York is all that could be desired and that the she will be ready for delivery by the end of February. The vessel is being built in a steel ship shed, 312 feet long and 50 feet wide. She is completely framed and plated and almost two thirds riveted. The steel interior work together with the stiffening, framing and bulkheads are practically finished and the Mr. Hanscombe expresses the opinion that the hull will be the strongest and most rigid of any pleasure craft afloat. Pneumatic tools are being used in the hull work and the hull was practically completed last week. The yacht will be fitted with bilge keels. It is stated that the engines will be the largest yet constructed by the Bath company. The bed plate, cylinders and columns are cast and will soon be erected while the boilers are nearing completion. There are now on the stocks at the Bath yard eight vessels that are to attain speeds varying from 12 to 30 knots; an aggregate of 30,000 horse power and a total valuation of $2,500,000. But the Bath Company is still figuring on additional contracts.

The tank steamer Atlas, building for the Standard Oil Co. at the Roach yard, Chester, Pa., was launched last week. She is 264 feet over all, 40 feet beam, 25 feet depth and 18 feet 6 inches draught. She has twelve tanks with a capacity of 720,000 gallons of oil. The vessel has triple expansion surface considering engines with cylinders 21, 36 and 56 inches by 42-inch stroke, and steam will be supplied from two steel boilers at a working pressure of 180 pounds. The vessel, which was designed by Naval Architect John Haug of Philadelphia, will be supplied with the American Ship Windlass Co.'s windlass and capstans, a Wiliamson steam steering engine and Baldt anchors. The Atlas is built more substantially than some of the war vessels. The rivets and seams throughout were driven until they were cold and then calked in all parts of the hull. The water and oil tanks were tested with hydraulic pressure and if the smallest kind of a leak developed the rivet was drawn and a new one subsituted. The new vessel is thoroughly water and oil tight.

The W. & A. Fletcher Co., Hoboken, N. J., have contracted to build for the Albany & Troy Steamboat Co., a steamer 130 feet keel, 42 feet beam and 7 feet depth of hold to replace the steamer William M. Whitney on the upper Hudson river. The hull will be built by William H. Baldwin, New Baltimore, N. Y. The side wheel steamer which the Fletcher company has contracted to build for the Old Dominion line will be under way in a short time. The hull will be built by T. S. Marvel & Co. Newburgh, N. Y.; William Rowland will do the joiner work, and the Fletcher people will, of course, furnish the engines. The new steam yacht Corsair, under construction at Marvel & Co.'s yard for J. Pierpont Morgan, will be launched the first week in December, and will immediately to towed to the yard of the Fletcher company at Hoboken in order that her engines may be placed aboard.

The marine department of the Maryland Steel Co., Sparrows Point, Md., has been awarded the contract for a 23 knot vessel for the New York & New Haven Steamship Co. for service between the ports named. She will be 325 feet in length with a tonnage of 6,000 to 7,000. Work will begin at once. The Maryland company has of course, the contract for three torpedo boat destroyers for the U. S. government, and negotiations have just been concluded whereby they will construct for the Baker-Whiteley Coal Co., a steel tug, the Brittania, 125 feet over all, 24½ feet beam and 14 feet depth with triple expansion engines having cylinders of 12½, 23½, and 39 inches by 28 inch stroke, to develop 800 horse power. The tug will be fitted with steam steering gear and capstans and an electric lighting plant.

Work is being pushed on the contracts on hand at the yard of the Harlan & Hollingsworth Co., Wilmington, Del. The Kershaw, building for the Merchants' & Miners' Transportation Co., Baltimore, Md., is in frame and the keel has been laid for the Nantucket, her sistership. New ways are being constructed for the Porto Rican steamer to be built for Miller, Bull & Knowlton, Hanover Square Building, New York. Among improvements in the equipment recently undertaken at the Harlan & Hollingsworth plant is the enlargement of the electric crane, enabling an arrangement of the supports so that a clear space will be left beneath the structure for use as a passage.

At the bureau of yards and docks, navy department, Washington, D. C., bids will be opened on Saturday for furnishing to the New York navy yard three boilers, set two in one battery and one separate, so that another may be added at any time. There will be also one feed water heater and two feed pumps. Each boiler to be not less than 200 nominal horse power, to have not less than 2,000 square feet of heating surface and 40 square feet of grate surface, to be of the inclined water tube type and designed for a working pressure of 150 pounds.

Bids will be opened at the bureau of yards and docks, navy department, Washington, D. C., on Saturday for furnishing to the Boston navy yard two boilers set in one battery, one feed water heater, one pump, etc. Each boiler will have an evaporative capacity of 6,900 pounds of water per hour and be designed for a working pressure of 150 pounds. There is to be furnished installed and connected up a double-acting feed pump of sufficient power to supply four 200 horse power boilers and also one feed water heater of 800 horse power capacity.

Bids for the construction of the proposed dry dock at the Boston Navy Yard will be publicly invited in a few weeks. The dock will be located parrallel with the present granite dry dock, and distant about 300 feet. It will be constructed of granite or concrete faced with granite. Its dimensions will be: Length, 750 feet; width on the floor, 80 feet; width at top, 114 feet; width at entrance, 95 feet; depth at floor, 40 feet; draught of water on the sill, 30 feet. The contract for the dock will be let in one sum for the entire work, complete.

Press dispatches state that the Neafie & Levy Co., Philadelphia, has in prospect a contract for the construction of two fast vessels for a new daily steamship line between Providence and New York, a project by regarding which there has been considerable gossip of late. According to report the plans which have been drawn contemplate twin screw vessels 200 feet long, 40 feet beam, 16 feet depth, with a carrying capacity of 1,000 tons of freight and 200 passengers and a speed of 20 knots.

E. J. Codd Co., Baltimore, Md., has just contracted to build two vessels. One is a fish steamer for Reed & Edwards, Reedville, Northampton county, Va., and will be 112 feet long, 19 feet beam, 8 feet 6 inches depth, with engines of steeple compound type and a Scotch boiler. Hoisting engine, windlass and capstan are to be provided. The other contract is for a steam dredge for the Baltimore Dredging Co. The Codd company will build all machinery for these vessels.

The navy department has practically decided to make the contemplated changes in the designs for the four monitors of the Arkansas class, for which contracts were recently let to Lewis Nixon, the Bath Iron Works, the Newport News Co. and the Union Iron Works, San Francisco. The alterations will increase the displacement from 2,700 to 4,000 tons; coal capacity from 200 to 490 tons; horse power from 2,400 to 3,200, and draught from 12 feet 6 inches to 14 feet 6 inches.

The Japanese cruiser Chitose, building by the Union Iron Works, San Francisco, had steam up in her donkey boiler last week and her dynamo and auxiliary machinery was tested. She will go into dry dock to be painted and have her propeller wheels placed in position, and it is expected that she will be ready for her trial trip by Dec. 1. The ferry boat Berkeley—largest in the world—recently completed by the Union Iron Works had a very successful trial trip a few days since.

The Gas Engine & Power Co. and Seabury & Co., consolidated, Morris Heights, N. Y., has made remarkable progress on the torpedo boat Bailey. Members of the Society of Naval Architects and Marine Engineers, who visited the ship yard during the recent New York meeting, were surprised to find the plating of the vessel all but completed. The boat could be launched almost any time but in all probability will not go into the water until January. She is 205 feet over all and 19 feet beam.

At the Cramp yard, Philadelphia, high water mark has been reached in the number of men employed, there being on the payroll at the present time 5,124 men, with a prospect that they will be given steady employment for two years. The battleship Alabama is 70 per cent completed. Her engines are in place but the armor has not yet been received. The steamer Olivette is now at the Cramp yard for conversion into a troopship.

Three vessels building on the Pacific coast are for the Honululu trade. Four-masted schooners being built at Eureka by H. D. Bendixsen and at Alameda by Hay & Wright are each 104 feet long, 37 feet beam and 18 feet deep, and a four-masted barkentine, also being built at Eureka, and which has not yet been named, will be 191 feet over all, 39 feet beam and 16 feet deep. Hind, Rolph & Co. will own the fleet.

Specifications for the 40-ton locomotive jib crane for the Port Royal naval station provide that the crane is to have a working capacity of 40 gross tons at a radius of 76 feet, measured from the center of the track. The reach is to be variable for a distance of not less than 15 feet within the extreme of 76 feet, and the maximum speed is not to be less than 50 feet per minute.

Additional interest is added to the rumor recently circulated to the effect that the Cramp Company, Philadelphia, may build four steamers for the United Steamship Co. of Copenhagen, by the report of Ambassador Hitchcock at St. Petersburg that the above company, which also recently purchased the Thingvalla line, is to establish a direct line between Russia and the United States.

The Hyde Windlass Co., Bath, Me., is so crowded with orders that a night force is being operated in many departments. The Hyde company has the contract for equipping almost all the vessels now building in the Cramp yard, at Philadelphia, including the United States battleships Alabama and Maine, the Russian battleship and cruiser, and the two Ward line steamers.

The Burlee Dry Dock & Machine Co., Port Richmond, S. I., has launched the tug Fred B. Dalzell, building for the firm of Fred B. Dalzell & Co., South Street, New York City. She is 107 feet over all, 23 feet beam and 12 feet depth and will be fitted with masts and sails. Her engines are of the compound type. She will be ready for service by Jan. 1.

The battleship Wisconsin, building by the Union Iron Works, San Francisco, will be launched next Saturday. The Wisconsin is a sister vessel of the Alabama, building at Cramps' yard, and the Illinois, recently launched by the Newport News Ship Building & Dry Dock Co. Both have been fully illustrated and described in the Review.

An air of activity is to be taken on by the Nova Scotia ship yards. H. Elderkin & Co. of Port Greville have secured the contract for a schooner of 300 tons register, while orders for schooners have also been placed with Mr. Young and with J. Smith, both of Lunenburg, Nova Scotia.

Work is progressing at the works of the Herreshoff Mnfg. Co., Bristol, R. I., on the vessel that is to race the yacht now building abroad for Sir Thomas Lipton. The cradle for the new yacht at the Herreshoff yard is almost completed and the casting of the lead keel for the boat will take place within a few days.

There is no diminution in the energy displayed by the William R. Trigg Co., Richmond, Va. A force of ten draughtsmen is at work on the drawings for the torpedo boats and destroyers, and W. H. Waddy, master ship fitter, Mr. Alexander Cruikshank, master mechanic, and Mr. R. M. Wood, mould loft draughtsman, have reported for duty.

The Charles Barnes Co. Cincinnati, O., is building a steel hull steamboat for the Santa Ano Mining, Co., Colorado River, Cal. The hull will be shipped in sections by rail and will be riveted together on the bank of the Colorado at Needles, a point where the Santa Fe railroad crosses the river. ,dcd

Three steel tenders which the Sweeney Bros. Co. of Louisville, Ky., is building for the Mississippi River Commission of St. Louis are to be known as the Mercury, Venus and Mars. Each vessel is 93 feet over all, 18 feet beam and 4 feet depth and their engines have 8¼ inch cylinders with 4 feet stroke.

The Shelby Steel Tube Co. has contracted for another piercing mill to be erected either at the Greenville or the Ellwood works. This new mill will give the company sufficient capacity to produce all the hollow billets needed instead of buying them from foreign sources.

The yacht building by the Gas Engine & Power Co. and Seabury & Co., consolidated, Morris Heights, N. Y., for John P. Duncan of the New York Yacht Club will be known as the Kanawha. She will be 225 feet over all and is expected to attain a speed of 22 knots.

Four or five weeks will be required for the completion of the steel fire boat Illinois, recently launched by the Chicago Ship Building Co. and designed for use at Chicago. The boat is 118 feet in length by 24 feet beam and will cost $68,500.

Bids opened for the traveling crane for the Norfolk, Va., navy yard, were: William Sellers, Philadelphia, $11,980; Morgan Engineering Co., Alliance, O., $14,952; H. S. Manning, New York, $14,221; the Wellman-Seaver Engineering Co., Cleveland, O., $19,760.

Proposals will be received at the United States engineer office at Duluth, Minn., until Dec. 20, 1898, for building pile and timber revetments for ship canals across Keweenaw Point, Mich. Advertisement in current issue of the Review.

The Pusey & Jones Co., Wilmington, Del., has laid the keel for the large car float for which they recently secured the contract from the Chesapeake & Ohio Railroad Co. The Float will be 250 feet long, 34 feet beam, 12 feet depth and have a carrying capacity of sixteen cars.

E. G. Crosby of the Crosby Transportation Co., Milwaukee, Wis., has purchased for $1,000 the fore-and-aft compound engine and two boilers from the steamer Horace A. Tuttle, recently wrecked at the Michigan City harbor entrance.

H. M. Bean, Camden, Me., reports that work is progressing on the immense five-masted schooner recently described and illustrated in the Review. Planking has commenced and it is hoped that the vessel will be ready for launching Dec. 28.

Sawyer Bros., Milbridge, Me., have closed a contract with Capt. Crabtree of Hancock Point, Me., for a three-masted schooner of 500 tons and are negotiating with Philadelphia parties for the construction of a four-masted schooner of 1,200 tons.

The E. J. Codd Co., Baltimore, Md., recently launched a barge which they are building for the Tunis Lumber Co. for use in the North Carolina sounds. The barge will be 72 feet in length, 24 feet beam and 6 feet deep. The machinery equipment will include double derricks for hoisting logs.

The Spedden Ship Building Co., Baltimore, Md., recently launched the tug Scandinavia, building for the Baker-Whitely Coal Co. She is 75 feet long, 17 feet beam and 8 feet 6 inches depth of hold and fitted with a compound engine and fire pumps.

Wooden ship builders at Bath, Me., are pretty well provided with work. G. G. Deering is building a four-masted schooner; Percy & Small are building a five-masted schooner and Nathaniel T. Palmer has almost ready for launching a five-masted schooner.

The Wilmington Transportation Co. of San Pedro, Cal. will build a 17-knot steamer; 200 tons, 120 feet long and 650 horse power; for service out of Port Los Angeles.

It is learned on good authority that Lewis Nixon of the Crescent ship yard, Elizabeth, N. J., is figuring on a contract for five steel schooners, which an Atlantic coast firm contemplates building.

Dunn & Elliot of Thomaston, Me., a few days ago launched the four masted schooner C. S. Glidden. She is 187 feet keel, 42 feet beam, 19 feet depth and of 1,100 tons register. She is four-masted and has three houses.

Henry Dubois Sons Co., New York City, has been incorporated with a capital of $50,000 to engage in dock building, dredging and excavation; Jacob Dubois, 4 Fulton street, New York.

A steel vessel under construction at the yard of Arthur Sewall & Co., Bath, Me., is fully one-third plated and the work of laying the upper deck is nearly completed.

Vaughan D. Bacon, Barnstable, Mass., has leased the boat shop at Osterville, Mass., vacated some time ago by H. Manley Crosby, and will operate it, having secured the contract for six small sail boats.

Bids will be received until Nov. 28 by Lt. Col. Oscar F. Long, U. S. Q. M., 36 New Montgomery street, San Francisco, Cal., for furnishing one tug boat.

The steamer Alert, owned by Henry Cooper, River View, Fla., will go into dry dock for extensive alterations and will also be equipped with new machinery.

Highland Lake Steamboat Co., of Bridgton, Me., has been incorporated with a capital stock of $10,000 for owning and operating steamboats on Highland lake. Winburn M. Staples of Bridgton, Me., is president.

William Rogers, Bath, Me., has launched the four-masted schooner barge Virginia, building for the Atlantic Transportation Co., New York. She is 245 feet in length, 44 feet beam and 49 feet depth. She is fitted with

The Portland & Mt. Desert Steamship Co. of Portland, Me., has decided to equip the steamer Frank Jones with a searchlight of 10,000 candle power.

Lightship No. 46 is being thoroughly overhauled and repaired at the ship yard of the Pusey & Jones Co., Wilmington, Del. She will be ready to go into service again on Dec. 1.

The new tug building by William H. Baldwin of New Baltimore, N. Y., for C. Robinson, West Troy, N. Y., is nearing completion. Machinery and boiler will be furnished by the Skinner & Arnold Co., Albany, N. Y.

At the annual meeting of the Norwich & New York Transportation Co. at Norwich, Conn., directors were chosen who subsequently elected A. G. Bullock, president and O. L. Johnson, Jr., secretary.

The Columbian Iron Works, Baltimore, will be ready in a short time to launch the tug building for the Consolidated Coal Co. The plates are all on the frames and the deck is laid.

The ship yard of Robert King at Lapeer, Mich., was recently entirely destroyed by fire. Loss, estimated, $25,000. Insurance, $4,000.

Tarr & James of Essex, Mass., are building a schooner of 105 tons for Capt, Charles Young.

a Hyde steam windlass, two large wrecking pumps and anchors manufactured by the Baldt Anchor Co., Chester, Pa.

Harbor commissioners of Montreal, Canada, intend to increase their harbor fleet by the addition of a steel tug, and have invited tenders.

The marine railway at East Greenwich, R. I., recently operated by A. P. Newell, has been sold to William H. Holmes.

The Bath Iron Works, Bath, Me., secured on their bid of $94,500 the contract for the remodeling and refitting of the army transport Manitoba.

Allan R. Lype of Oneida, N. Y., has begun the construction of a self-bailing and self-righting life boat of a design formulated by himself.

Gardner & Cox, naval architects, 1 Broadway, New York, have orders for a large cruising schooner for a prominent New York yachtsman.

COLLIS P. HUNTINGTON ON SHIP BUILDING.

During a recent visit to the ship yard at Newport News, Va., Mr. Collis P. Huntington, principal stockholder in the Newport News Ship Building & Dry Dock Co., talked quite freely regarding the condition and prospects of the institution and the improvements contemplated. He is quoted as saying:

"I am very much pleased with the condition of the ship yard, as I think it never looked better than it does today, and it was never in better condition to do quick and efficient work. Just at present the appearance of the yard is a little spoiled by the preparations now under way for the construction of our great dry dock, which is to be 850 feet long and capable of taking in two battleships at a time. But we can put up with the looks for the sake of what will be accomplished by and by. We are always contemplating improvements and continually making them. This country has something like 80,000,000 of people with an insufficient navy and practically no merchant marine. Many ships will have to be built in the future, as the naval policy of the United States is established for a long time, and it means constant additions to our navy, until we shall have become ultimately second, perhaps, to none. I think, too, that we are going back for a new example to a period just before the civil war, when our merchant ships covered the seas and called at every port. I think any intelligent man can see the signs of the times pointing that way. It is because I realize the future in store for this country in the way of a great ship building industry that I am making the Newport News yard in readiness to build anything, that comes along in the way of a ship."

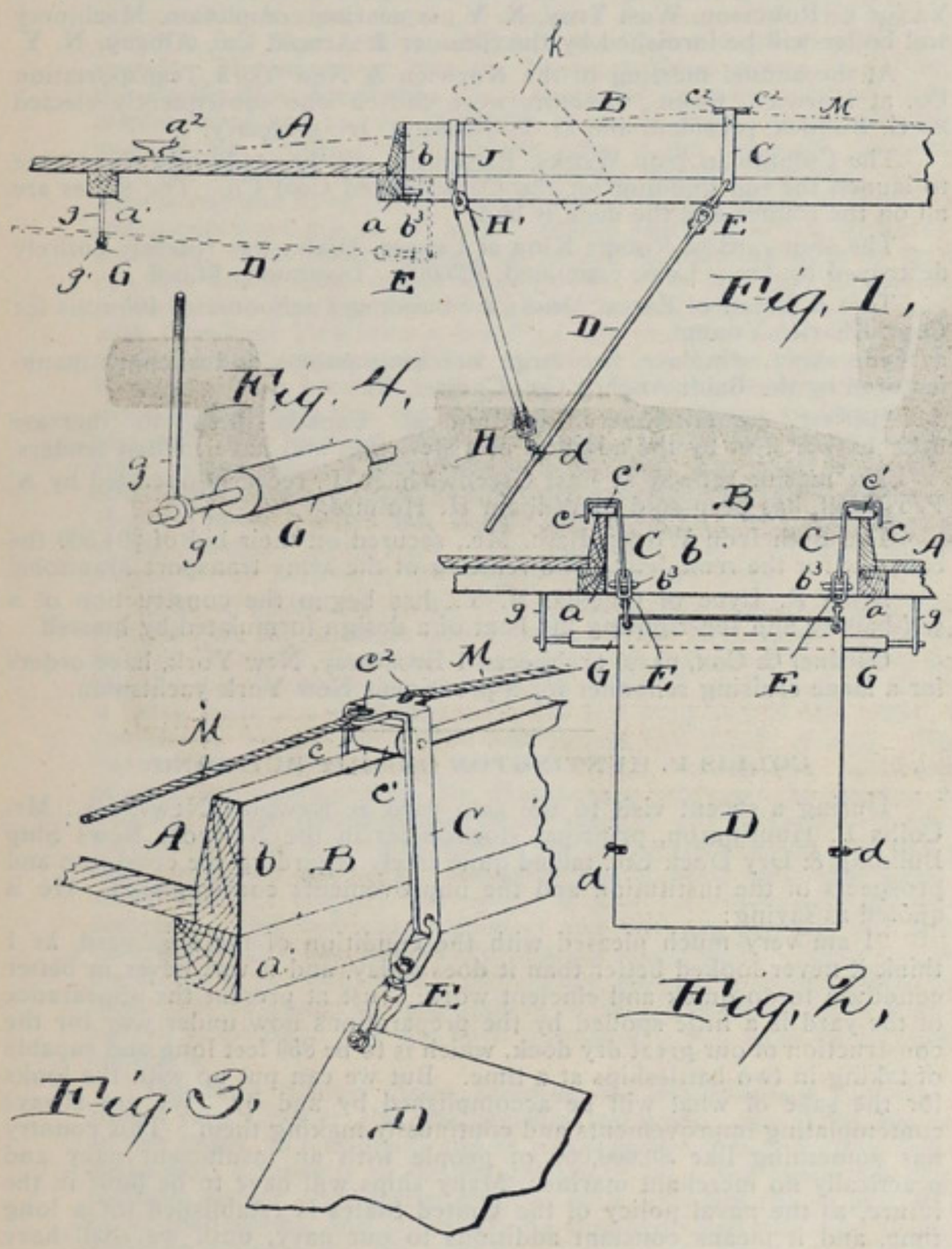
In answer to a question as to whether any vessels would be built at the Newport News yard for the Pacific Mail Steamship Co. he said: "I anticipate building at least a couple of ships for the Pacific Mail Steamship Co., as its business has increased so rapidly that the acquisition of ships of very much larger capacity than those she now has is necessary. The trade between the Pacific coast and the Orient is already very large and growing year by year. It isn't more business that we want now so much as sufficient tonnage to take it."

In the course of the interview Mr. Huntington added: "I want to say just a word about the past. I was down here in 1837, sixty years ago, and I said to myself then that New York city ought to have been built on this peninsula. Of course, the time has passed when Newport News could have hoped to rival New York as a money centre, for New York will probably always be the great metropolis of finance in this country, but I am glad to say that I have no doubt that it will become the great manufacturing city of America, and that in ship building particularly it will, in time, excel any other place in the world, for everything favors such a resut and such a prediction. Its location, with respect to the business which would naturally come to it, is superb; its harbor will accommodate the fleets of the world, and I consider the labor as good as can be obtained anywhere. Newport News is greatly favored in its proximity to that vast and fertile country, including the lower Ohio and Mississippi valleys, whose products should be transferred from rail to ship, and vice versa right here at our docks, for the tonnage naturally gravitates to this point."

ORE TRIMMING DEVICE.

Among United States patents recently granted (Nov. 8, 1898) was one to Wm. H. Mack, Perry-Payne building, Cleveland, for a trimming attachment for ore-carrying vessels. The invention relates to a deflecting plate, so suspended in the hatchway of a vessel as to cause the ore to travel from the mouth of the dock chute to either side of the vessel's hold, and includes convenient means for moving the plate to the desired position, for holding it there and for safely carrying it when not in use. The deflecting plate, which is of steel, is swivelled at its upper end to hangers that carry rollers riding on the hatch coaming, there being suitable means for holding the hangers in place and for upholding the end of the deflecting plate.

"I do not claim that this device is new in all its parts," said Wm. H. Mack, in referring to the patent specifications, "or that it is as yet just the device we propose to use when we can go a little further with experiments on our vessels. Unfortunately, the schooners, to which the apparatus was first applied, have been chartered for Atlantic coast trade, but we had sufficient time on them to prove that we had solved two important requisites in a trimming apparatus. One aim was to get a device light in weight that could be readily handled by a couple of men from the ship's crew, and which would not be a great load to carry around, necessitating loss in the carrying capacity of the vessel. Another point was to provide means for carrying the device on the ship in a handy manner—off the deck and made clear of everything without great labor when not in use. As evi-



dence of the first object having been attained, it may be said that in a ship of eight hatches the total equipment would not exceed five tons in weight. There are really only two shifts of the apparatus required in loading a vessel and two men can handle it without difficulty. No extra labor is involved, no matter on which side the vessel may load or unload. The manner of stowing the device under the deck when not in use does away with difficulties encountered in trying to carry and handle extra hamper of this kind on deck. It is understood, of course, that the big steel vessels are managing to get along in some cases without trimming of any kind, but this apparatus is especially adapted to wooden vessels and the cost of it is fully low enough to warrant its use generally on such vessels as against the expense of about 2½ cents a ton for trimming."

The drawings printed herewith represent the apparatus in all its parts. When not in use, the deflecting plate, which is the main feature of the device, and which represents the greater part of its cost, is raised parallel with the deck and slid back on a roller out of the way beneath the deck, as indicated by the principal sketch. Fig 1 is a transverse vertical section through the deck and one hatchway. Full lines show the device in the position of distributing ore and dotted lines in the position in which it is carried when not in use. Fig 2 is a longitudinal vertical sectional view; Fig. 3 a perspective view of one hanger, upper corner of plate and swivel shackle connection between them; Fig. 4 a perspective view of one end of the device that supports the plate when the same is not in use.

The Review is indebted to Messrs. Thurston & Bates, Cleveland attorneys, who took out this patent for the description of it.

In a letter to the Review one of the officers of the Falls Hollow Staybolt Co., Cuyahoga Falls, O., says: "We are in receipt of an order for a carload of safety hollow staybolt iron from one of the largest manufacturers of marine boilers on the lakes. High quality and low price secured the order.

ENTIRELY COMMITTED TO WATER TUBE BOILERS.

In his anual report, just at hand, Engineer-in-Chief Geo. W. Melville says that at the present day it would be hard to find any design for the machinery of new naval vessels which does not include water tube boilers. He declares that demands upon the engineer for great power on small weight, in order to secure higher speeds for all classes of vessels, have practically ruled out the cylindrical boiler on account of its weight and inability to cary the high pressures needed. That part of Commodore Melville's report which deals with the boiler question is very interesting. He says:

"In the report of last year attention was called to the increase in the use of water tube boilers in all foreign navies, and the opinion was expressed that sufficient experience had been gained at home and abroad to warrant us in using boilers of this type in all our ships. The occurrences of the past year have served to strengthen this opinion, and the bureau in its recent designs, except for the battleships, has specified this type of boiler. In view of the fact that the department's plans for the battleships for which contracts have just been awarded on the builders' plans, provided for cylindrical boilers, an explanation of this seeming inconsistency is necessary. The bureau did prepare a design for water tube boilers, which it was very anxious to use, but it having been decided that the new ships should be practically identical with the Alabama class, and that no hull changes would be permitted, it was impossible to use water tube boilers, as that would have involved a readjustment of hull weights to maintain the trim. Notwithstanding this temporary postponement of the bureau's desire that all of our new ships should have water tube boilers, the department's circular of July 26, which encouraged builders to submit designs for higher speeds and greater endurance, made it almost certain that water tube boilers would be secured, inasmuch as the easiest way to accomplish the desired results was by their use, and there was little doubt that the builders when given the opportunity would submit plans for vessels as good as any in foreign navies. The bids which were received on Sept. 1 justified this idea, and although all the bidders did not offer water tube boilers it is practically certain that they will all install them, so that the bureau has the satisfaction of knowing that the machinery of these new vessels will be in all respects of the most modern type, as its own specifications would have called for had not the limitations imposed by conditions external to the machinery prevented this desirable consummation.

"The tactical importance of water tube boilers is also being thoroughly recognized, and has been emphasized by the conditions which obtained in our blockade of Santiago and the great victory of July 3. It was necessary for a long period that our ships should be ready to develop maximum power at a few minutes notice, and with cylindrical boilers this involved keeping all the boilers under steam, with heavily banked fires and an attendant large consumption of coal. Water tube boilers of the proper kind, which admit of the rapid raising of steam with safety, remove this difficulty and give the commanding officer a more complete control of his fighting machine. Without going at length into the other advantages of water tube boilers, which have been published repeatedly, it may be added that one very striking advantage for war vessels is that the boilers can be replaced or practically rebuilt without disturbing the decks, all parts being small enough to pass through permanent openings. This was the case in the Monterey, and it was strikingly illustrated this summer in the case of the Canonicus, Manhattan, and Mahopac, where it would have been impossible to use any but water tube boilers without practically rebuilding portions of the hull.

"It may be remarked in this connection that all of our torpedo boats have water tube boilers and that four large vessels, including the Monterey, are so fitted. The Chicago and Atlanta also have boilers of this type now installed. The four new monitors, for which bids will be opened Oct. 1, will have water tube boilers, and the sixteen destroyers have them as a matter of course. It thus appears that, as the new battleships to be built on the contractors' plans will also use water tube boilers, we have definitely taken the step of adopting them for all our vessels, and there can be little doubt that the efficiency of the fleet will be increased in consequence.

"In water tube boilers with straight tubes there has been thus far an unfortunate lack of economy under forced draft, but this will be avoided in the boilers for the new ships by using heaters for the air, which absorb the heat from the gases of combustion before they reach the smoke pipe and thus enable a good economy to be secured. As was stated in the last report, there is not yet any agreement as to the particular make of water tube boilers which is best from every point of view. Nearly every one has some feature of excellence, and it can not be doubted that, with the great amount of the best engineering talent which is working at the problem, one or more forms will finally be developed which will be thoroughly satisfactory in every way."

STRONG ENDORSEMENT OF A YACHT BOILER.

A good boiler is a source of considerable comfort aboard a yacht, and the owners of pleasure craft are usually profuse in their praises of steam generators that are satisfactory to them. There are few letters of approval from yacht owners, however, that are equal to the following, which was addressed recently to L. Boyers' Sons of New York by J. S. Loomis, lumber merchant of Brooklyn, N. Y.:

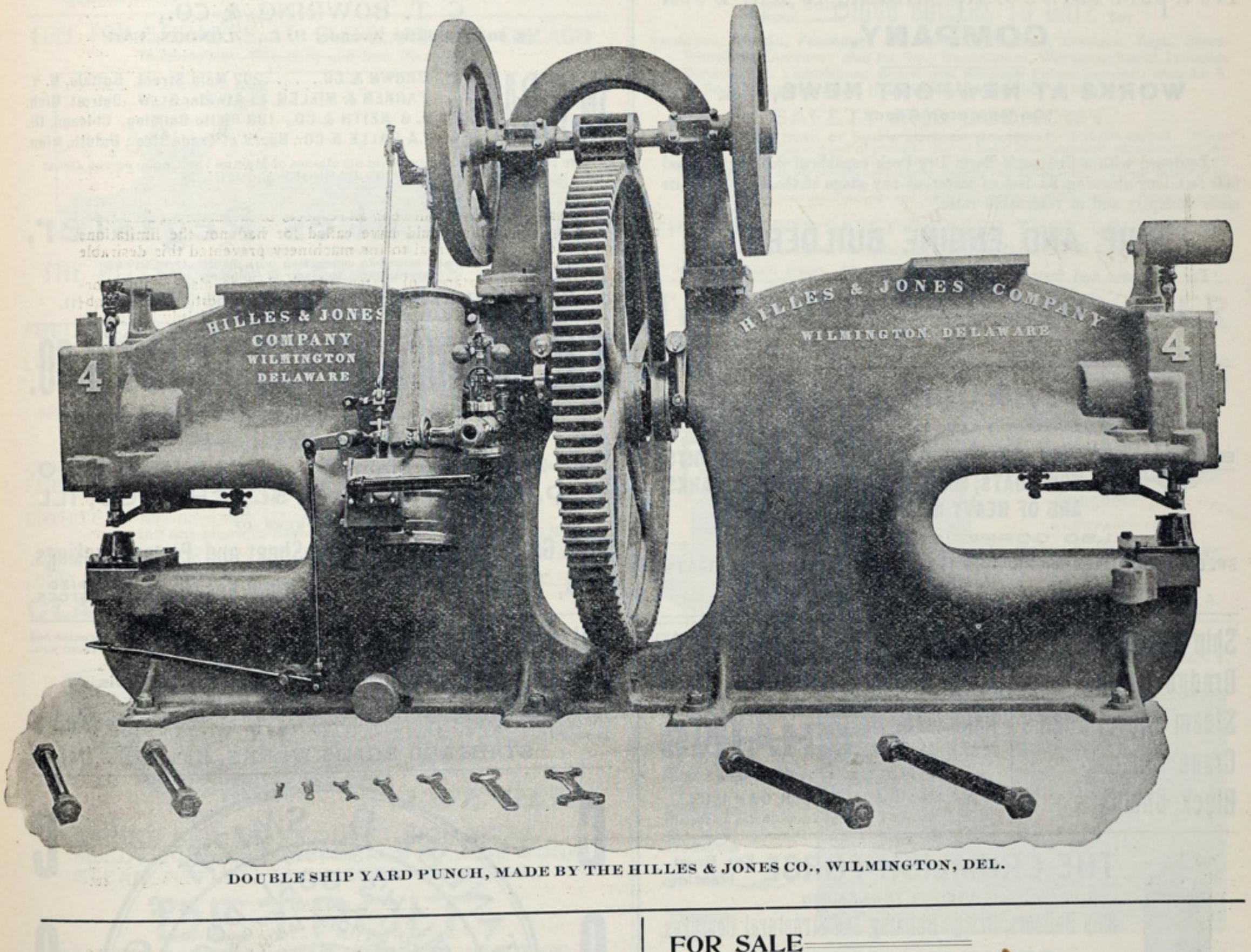
"In reply to your inquiry as to the working of the Boyer patent boiler that I had placed in the steam yacht Marguerite last May, I desire to say that I have used it almost continuously since that time and have run over 5,000 miles in the Sound and east as far as Cape Cod. I do not hesitate to say that it is the best and most rapid steamer I have ever known. The difference in weight compared with my last boiler decreases the draught four inches, and the boiler being set so much lower makes the yacht much steadier in a seaway. It produces steam much more economically than my former boiler. It has increased the speed a good two miles per hour. It carries water steadily and is very easily fired. I have found it very reliable in a vessel carrying steam steadily. I believe from my experience with it that the construction is perfect and extremely durable. It has most certainly proved to be all that was represented, and really it has so many good points in addition to those I have described, that I cannot do it justice on paper, or express myself strongly enough in its praise. I am pleased to have the opportunity to say what I have in its favor."

A DOUBLE SHIP YARD PUNCH.

The illustration on this page represents an improved type of double punch, No. 4 type, manufactured by the Hilles & Jones Co. of Wilmington, Del., and arranged especially for the handling of ship plates, angles and work of that description. Machines of this character have been sold recently to Wm. Cramp & Sons of Philadelphia, to the Harlan & Hollingsworth Co. of Wilmington and to other ship builders of this country and Europe. The main frames are of box section throughout, with the metal carried high above the eccentric shaft and under the floor to absorb the spring in punching. There are two fly-wheels, giving ample power for driving, and the spur wheel is large and well supported. The driving shaft is carried in the arch piece in bearings with caps at an angle to allow removal of the shaft without disturbing the gearing or any key. Driving on this machine is through a self-contained engine mounted on one of the halves of the main casing and forming a complete and substantial method of driving. Sliding heads are counterbalanced through spiral springs and have taper brass shoes for taking up wear. Die blocks are of cast steel with the die close to the front edge, so that it can be conveniently used on irregular work and angles. There is a clutch on each side of the spur wheel, so that both ends are independent and two gangs can work upon the machine at the same time. In addition to this clutch arrangement for starting and stopping the sliding head, there is a gag over each punch stock, which is preferred by many ship builders and which can be conveniently operated no matter what the width of plate. These machines are built for almost any capacity. The illustration shows a tool with 42 inches depth of throat on each side.

Mr. H. B. Roelker, of Maiden Lane, New York, who is now in Europe, has secured an order from the Austrian government for a new type of Allen dense air refrigerating machine for the torpedo gunboat Zenta. He is also installing a refrigerating plant in the Fuerst Bismarck for the German government. A half-ton vertical machine has been placed in the new yacht being built by Lawley & Co. of Boston for Mr. C. H. Jones of Boston. A large machine is being built for the Widner yacht, building at Neafie & Levy's, in addition to the several machines that have been sold recently to the United States navy department.

A new bridge just erected for the town of Bridgeton, Maine, has a clear span of 36 feet, a roadway 22 feet wide and a sidewalk 6 feet wide. It is of steel throughout except the floor plank, having latticed girder trusses and steel beams for the floor. The Berlin Iron Bridge Co. of East Berlin, Conn., were the contractors for furnishing and erecting the bridge.



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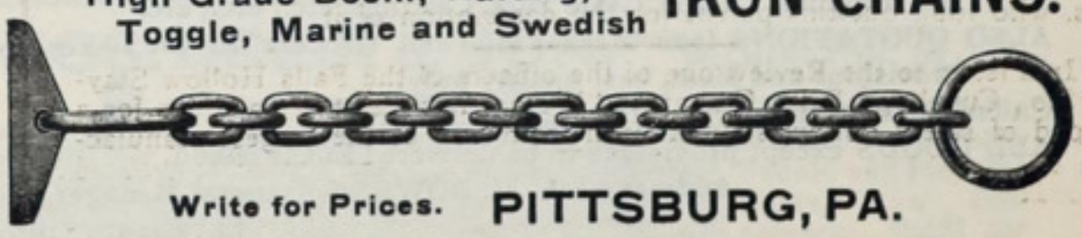

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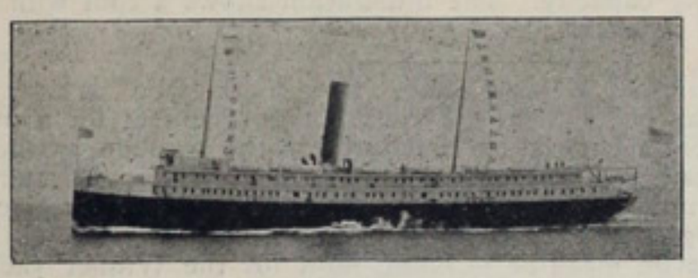

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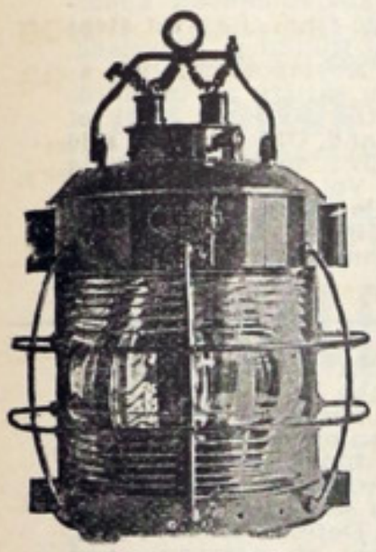

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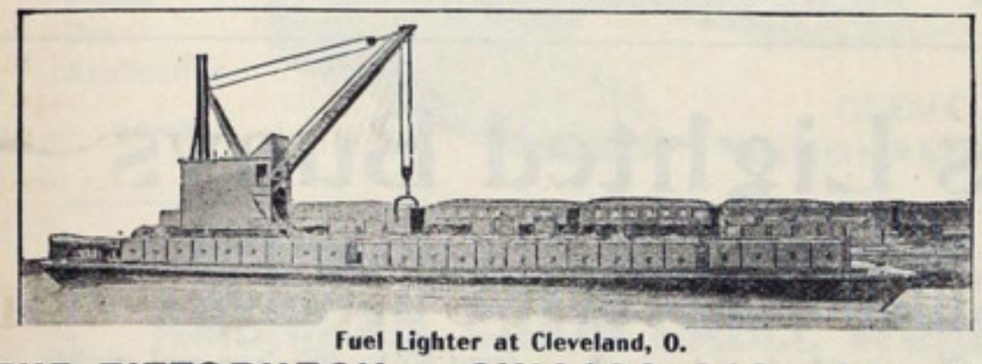

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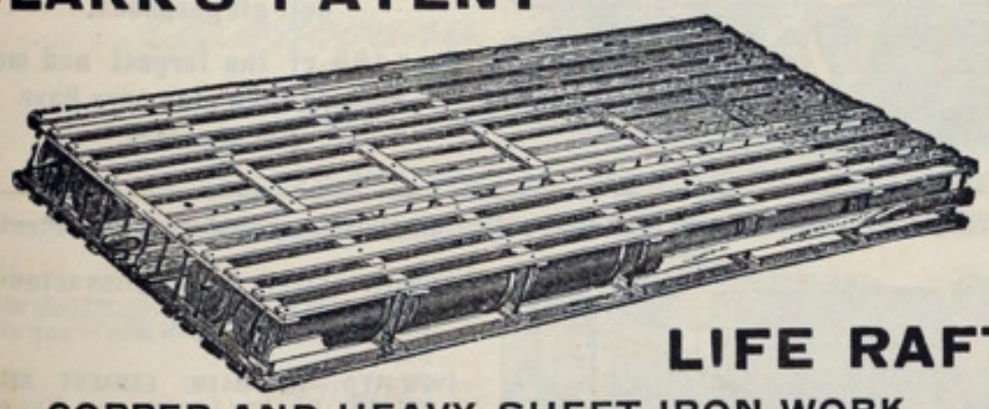

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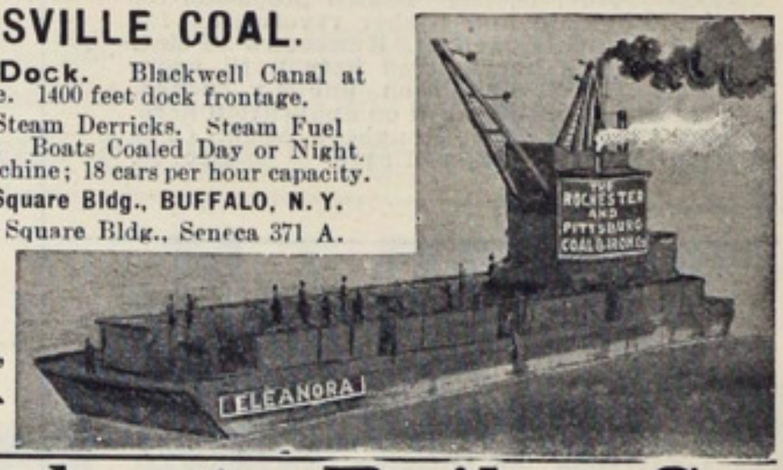

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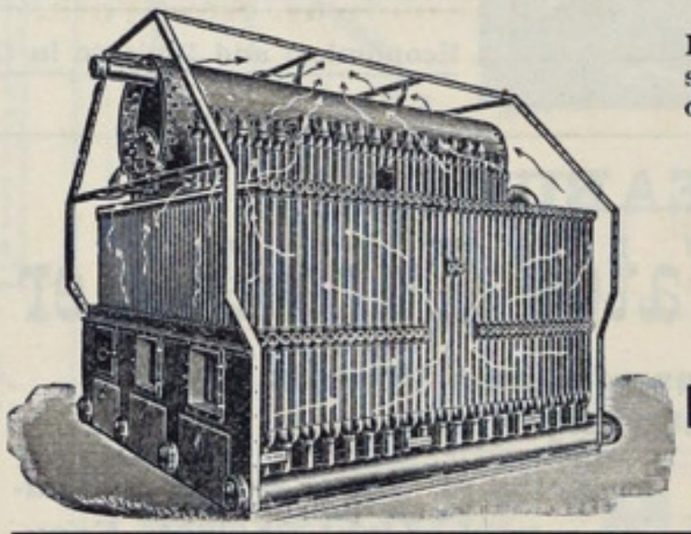

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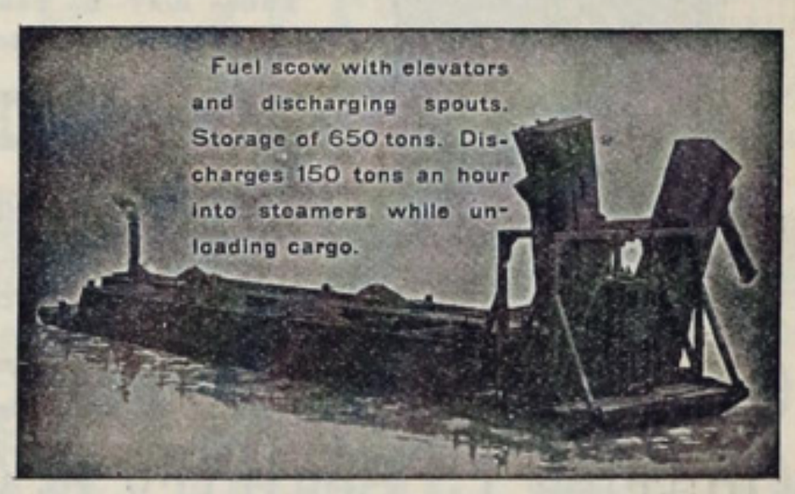
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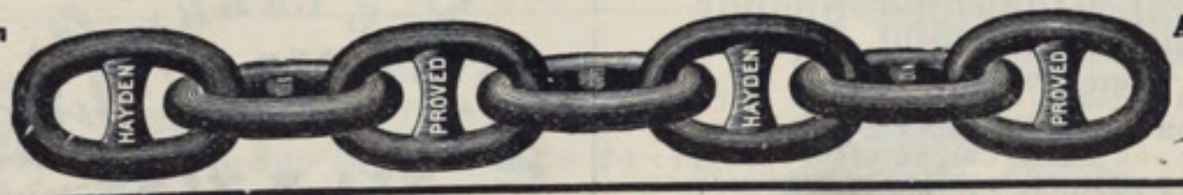

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U. S. Engineer Office, Duluth, Minn., Nov. 19, 1898. Sealed proposals for building pile and timber revetments for Ship Canals across Keweenaw Point, Mich., will be received here until noon, Dec. 20, 1898, and then publicly opened. Information furnished on application here or at branch office, Houghton, Mich. Clinton B. Sears, Major, Engrs. Dec. 15.

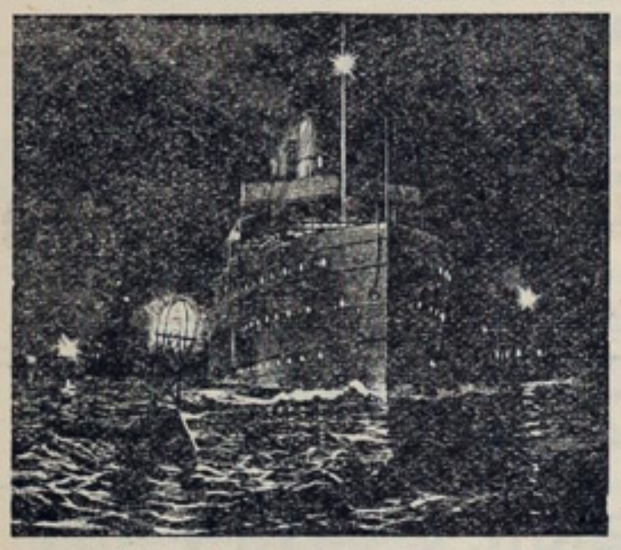
NOTICE.—The steam pile driver "FISHING QUEEN", owned by John W. Averill, Jr., burden about 7.91 tons, together with boilers, machinery, anchors, cables, furniture, tackle, and all appurtenances, will be sold from the west steps of the Post Office Building, Cleveland, Ohio, on Tuesday, November 29, 1898, at 10 o'clock, A. M., to satisfy an indebtedness of $7,700.00 of the National Bank of Commerce of Cleveland, Ohio, against said John W. Averill, Jr., under a certain mortgage, recorded Book 71, page 72, Office of Collector, Cleveland, Ohio. SQUIRE, SANDERS & DEMPSEY, Attorneys for National Bank of Commerce of Cleveland, Ohio. Nov. 24.

NOTICE.—The Pro. Tug HELENE, owned by John W. Averill, Jr., burden about 12.50 tons, together with boilers, machinery, anchors, cables, furniture, tackle, and all appurtenances, will be sold from the west steps of the Post Office Building, Cleveland, Ohio, on Tuesday, November 29, 1898, at 10 o'clock, A. M. to satisfy an indebtedness of $7,700.00 of the National Bank of Commerce of Cleveland, Ohio, against said John W. Averill, Jr., under a certain mortgage, recorded Vol. 17, page 71, Office of Collector, Cleveland, Ohio. SQUIRE, SANDERS & DEMPSEY, Attorneys for National Bank of Commerce of Cleveland, Ohio. Nov. 24.

SEALED PROPOSALS will be received at the office of the Light-House Engineer, Detroit, Mich., until 12 o'clock M., Nov. 21, 1898, and then opened, for furnishing the boilers and machinery for four complete steam fog signals, in sets of two, being two complete sets, or alternatively, for two sets of boilers in duplicate without engines, etc., delivered at the Light-House Depot at Detroit, Mich. Plans, specifications, forms of proposal, and other information may be obtained on application to the undersigned. M. B. Adams, Lt. Col. of Engineers, U. S. A. Nov. 24.

NOTICE.—The steel steam fish pile driver "IDEAL", owned by John W. Averill, Jr., burden about 13.18 tons, together with boilers, machinery, anchors, cables, furniture, tackle, and all appurtenances, will be sold from the west steps of the Post Office Building, Cleveland, Ohio, on Tuesday, November 29, 1898, at 10 o'clock, A. M., to satisfy an indebtedness of $7,700.00 of the National Bank of Commerce of Cleveland, Ohio, against said John W. Averill, Jr., under a certain mortgage, recorded Vol. 17, page 71, Office of Collector, Cleveland, Ohio. SQUIRE, SANDERS & DEMPSEY, Attorneys for National Bank of Commerce of Cleveland, Ohio. Nov. 24.

SEALED PROPOSALS will be received at the office of the Light-House Engineer, Detroit, Mich., until 12 o'clock M., Nov. 28, 1898, and then opened, for furnishing the boilers, machinery, etc., for four complete steam fog-signals, in sets of two (being two duplicate sets) delivered at the Light-House Depot, Detroit, Mich. Plans, specifications, forms of proposal, and other information may be obtained on application to the undersigned. M. B. Adams, Lt. Col. of Engineers, U. S. A. Nov. 24.



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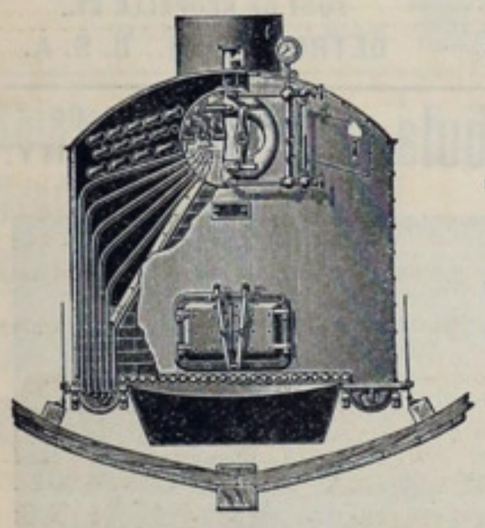

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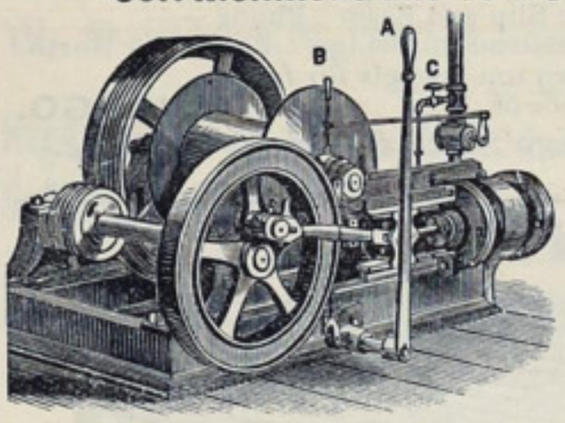

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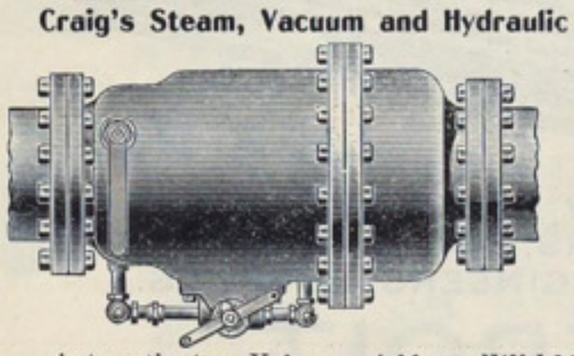

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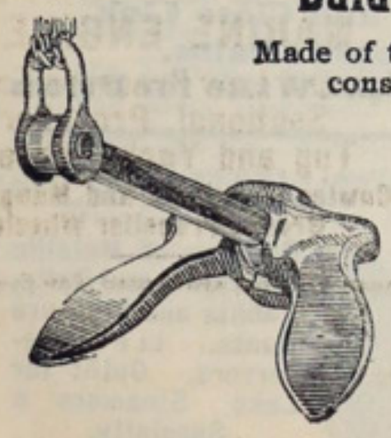

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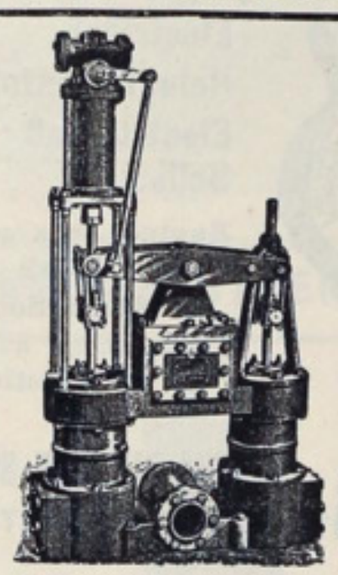

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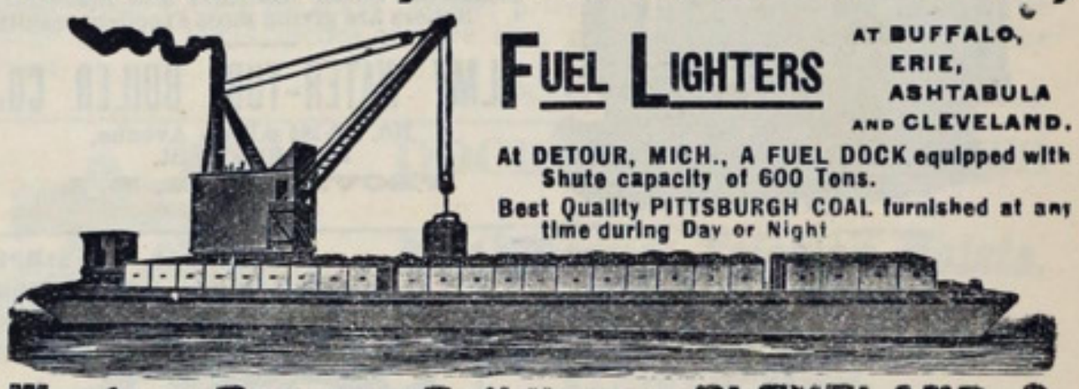

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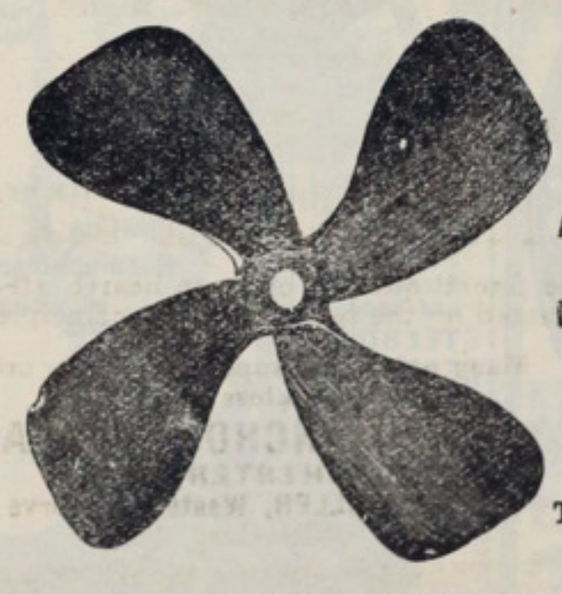

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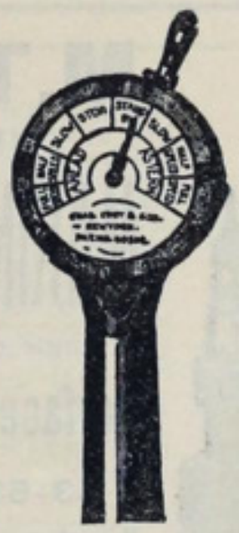

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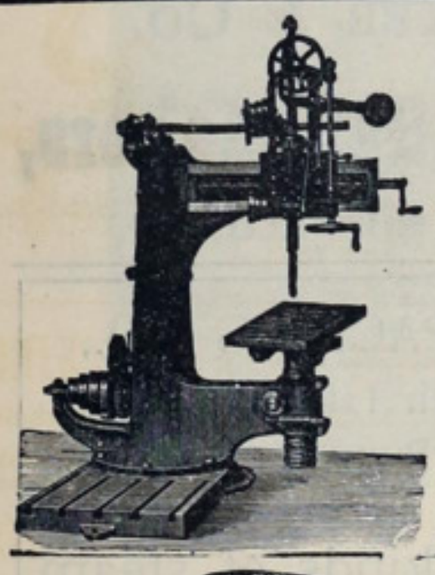

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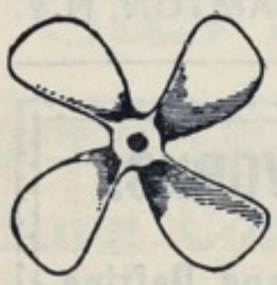

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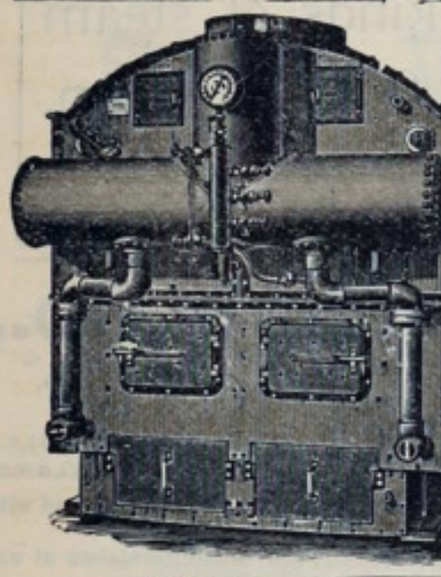

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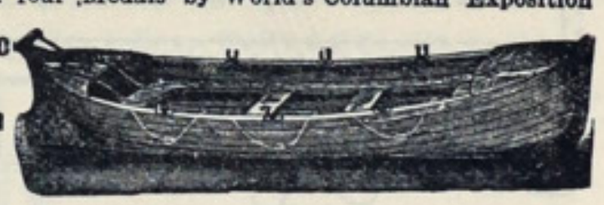

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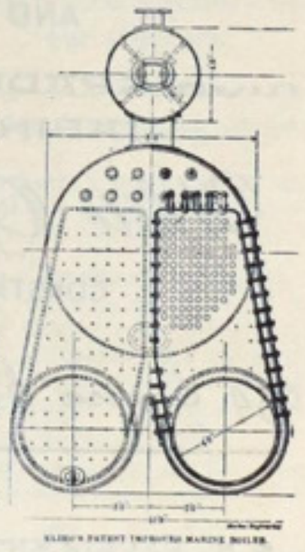

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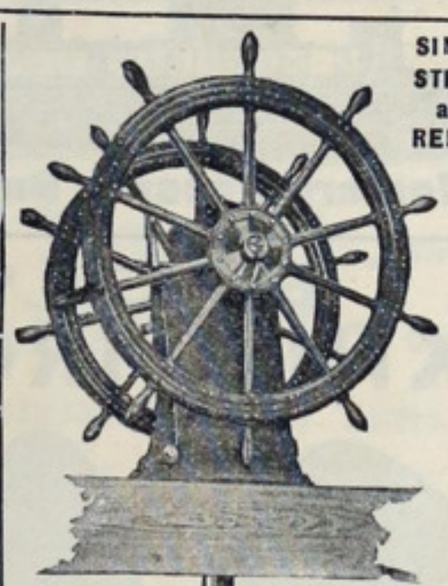

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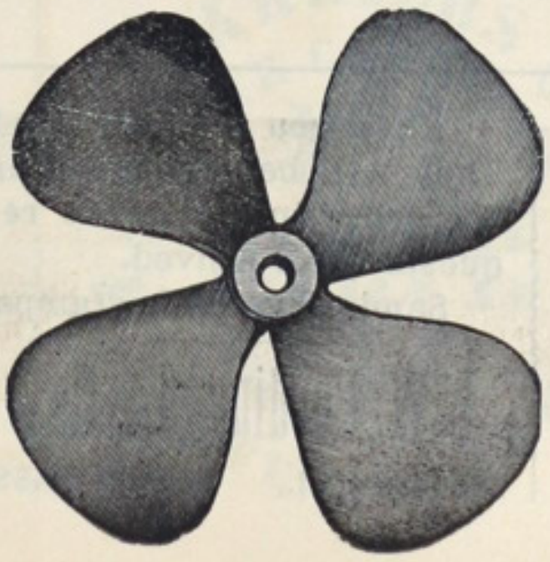

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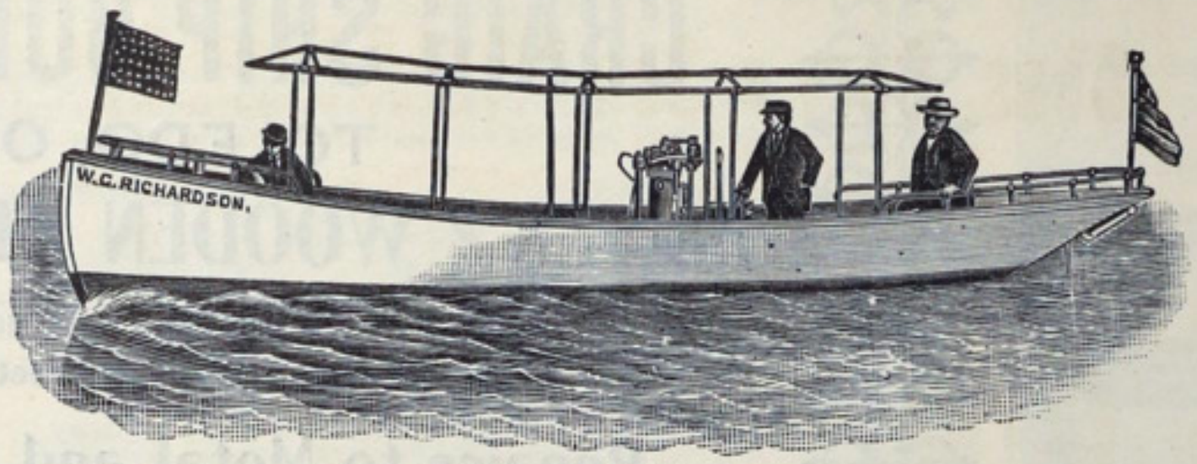

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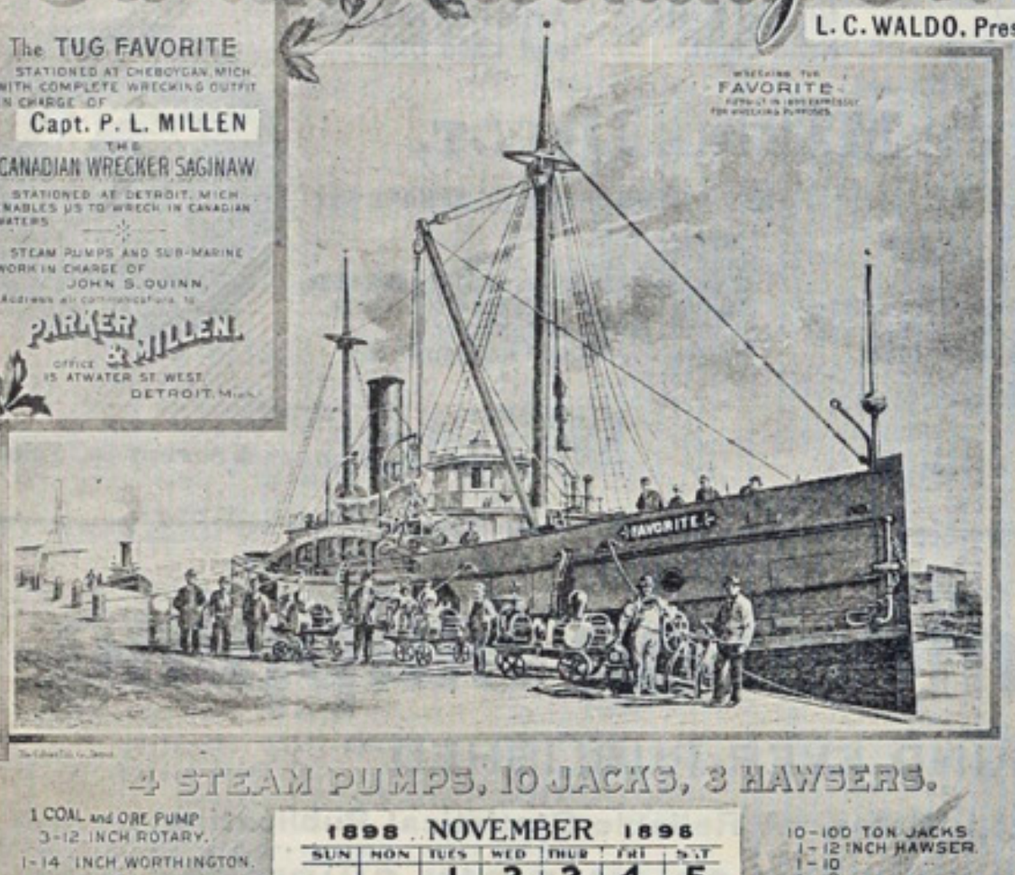

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1-10
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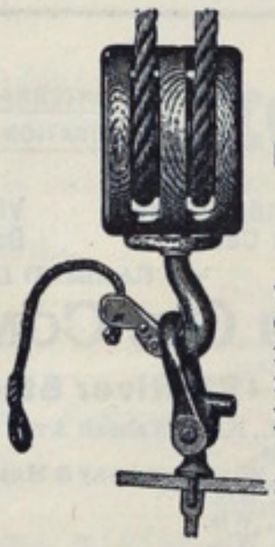

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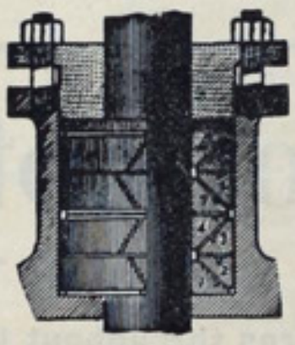

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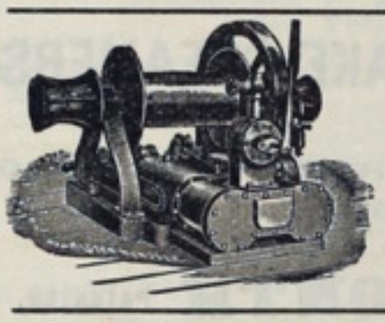

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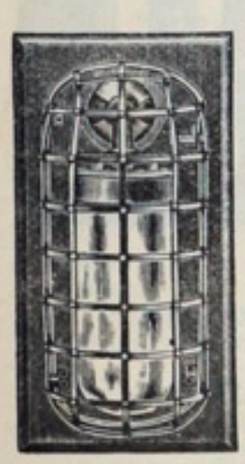

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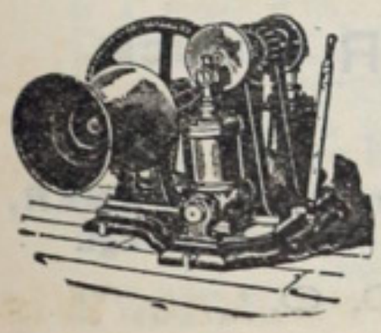

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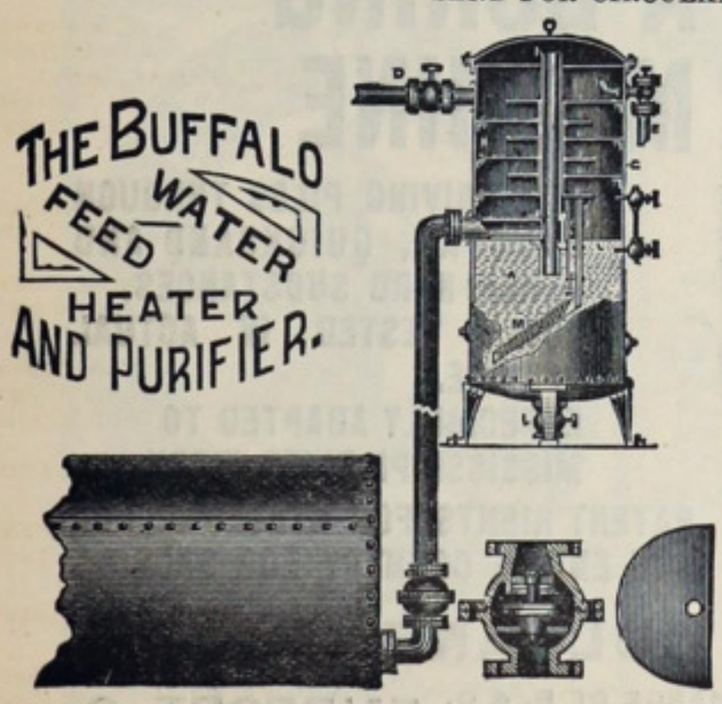

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Sheriffs Mfg. Co. .....Milwaukee.
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Globe Iron Works Co.....Cleveland.
Williamson Bros. .....Philadelphia.
Hyde Windlass Co.....Bath, Me.

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Hilles & Jones Co.....Wilmington, Del.

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American Ship Windlass Co.....Providence, R. I.

TOWING COMPANIES.
Barry Bros. Independent Tug Line.....Chicago.
Escanaba Towing & Wrecking Co..Escanaba, Mich.
The Vessel Owners' Towing Co.....Cleveland.

TUBING, COPPER AND BRASS.
Randolph & Clowes .....Waterbury, Conn.

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Foster Engineering Co.....Newark, N. J.

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Donnelly Salvage & Wrecking Co....Kingston, Ont.
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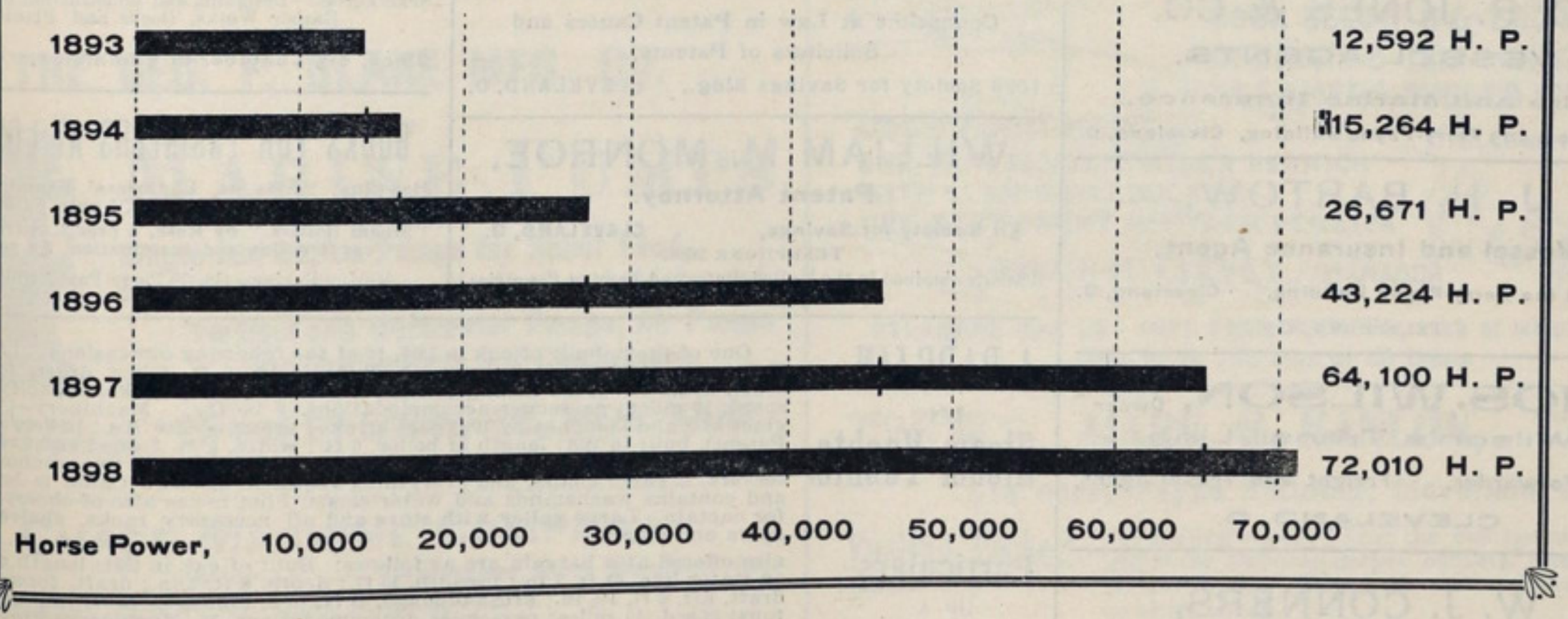

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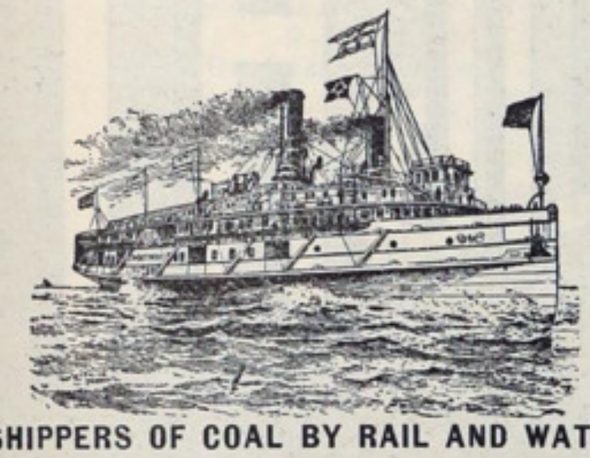

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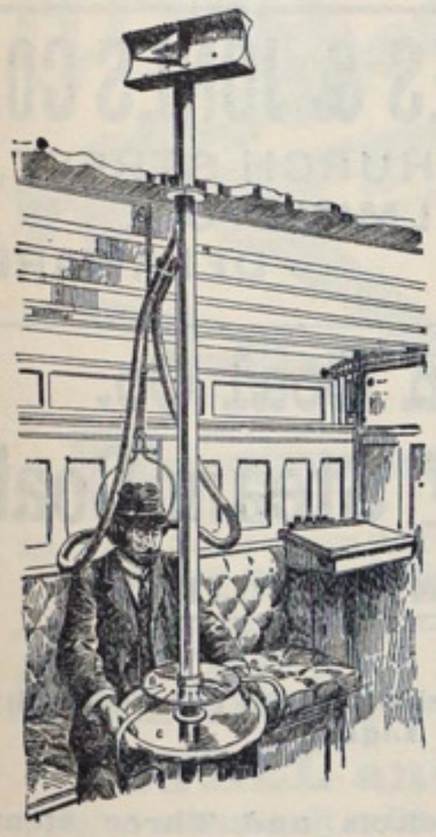

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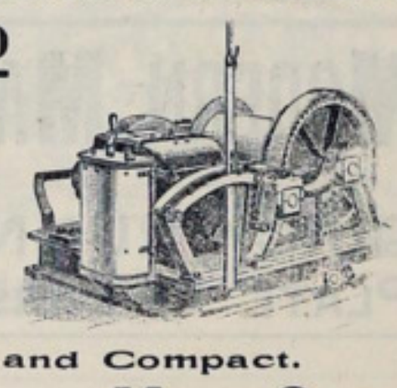

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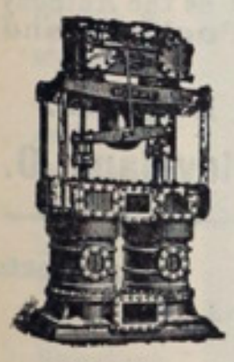

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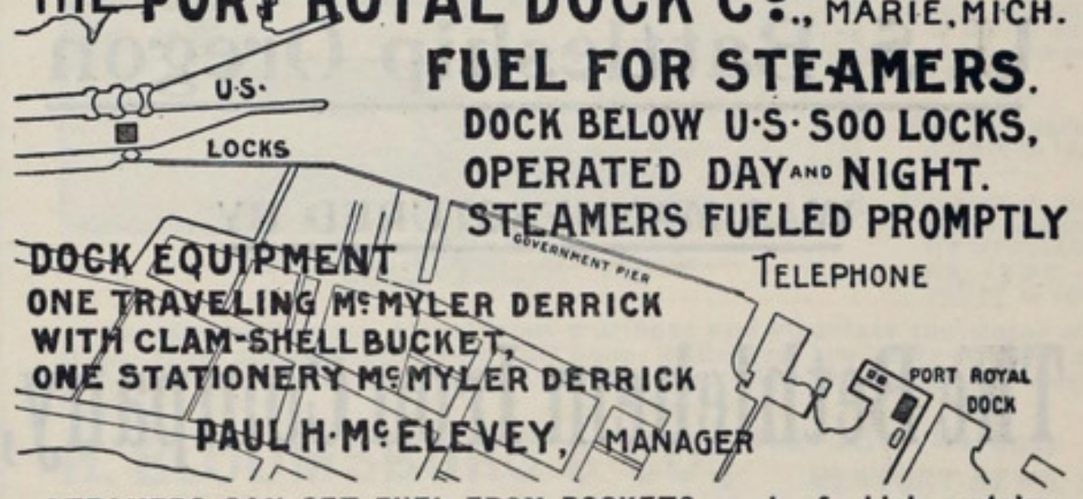

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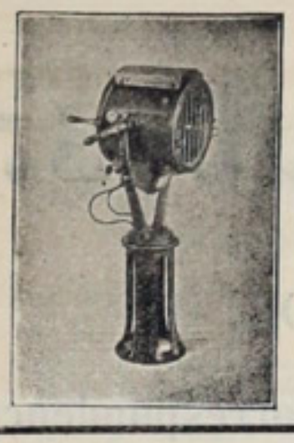

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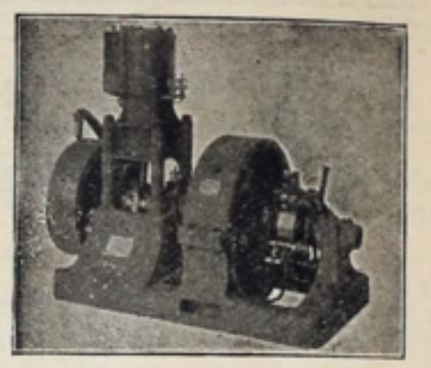

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THE "WELLS LIGHT" REG.

WALL WORK & WELLS PATENTS

12,000 IN USE.

ESPECIALLY ADAPTED FOR CONTRACTORS, QUARRIES, SHOVELS, RAILROAD CONSTRUCTION, DREDGES, BRIDGE & DOCK BUILDERS, WATER WORKS, BRICK YARDS & COAL DOCKS.

800, 2,000 TO 4,000 CANDLE POWER FROM KEROSENE OIL.

PORTABLE, SELF-CONTAINED, AUTOMATIC.

UNAFFECTED BY WEATHER.

400 RAILROADS AND OVER 500 CONTRACTORS NOW USE WELLS LIGHT.

MODERN MACHINE TOOLS FOR SHIP YARDS

SEND FOR CATALOGUE

QUICK RUNNING PUNCHES, BENDING ROLLS,
PLATE SHEARS, ANGLE SHEARS, PLATE PLANERS.

HILLES & JONES CO.,
912 CHURCH STREET,
WILMINGTON,
DELAWARE.

The Shafting

IN THE ENGINES OF THE

U. S. Battleship Oregon

WAS MANUFACTURED BY

The Bethlehem Iron Company,

SOUTH BETHLEHEM, PA.

STAYBOLTS

BOTH HOLLOW AND SOLID, OF THE BEST QUALITY OF CHARCOAL IRON.

HOLLOW STAYBOLTS are better than drilled or punched in every way. Cost less too. They save inspections and explosions—warn automatically. If you want solid staybolts, however, let us hear from you. Our circulars and prices will interest you.

FALLS HOLLOW STAYBOLT CO., CUYAHOGA FALLS, OHIO.

Cuddy-Mullen Coal Co.

Miners and Shippers of Steam Coal

FUELING DEPARTMENT FACILITIES:

CLEVELAND HARBOR—
Car Dumper; Eight Pockets 1,000 tons capacity; Three Steam Derricks; Lighter.

DETROIT RIVER BRANCH—
Amherstburg, Four Pockets and Three Steam Derricks; Sandwich, 14 Pockets and Two Steam Derricks.

ERIE, PA., BRANCH—Car Dumper.

SAULT RIVER BRANCH—
Two Docks at Detour (formerly known as the Anthony and Watson Docks) Equipped with Pockets and Steam Derricks.

Good Coal; Courteous Attention; Quick Dispatch.

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AVERAGE ADJUSTERS AND
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Special Facilities for Placing Marine Lines.

GREAT LAKES DEPARTMENT.

Guaranty Bldg., BUFFALO, N. Y.

S. F. HODGE & CO.

MARINE ENGINES,
PROPELLER WHEELS,
DECK HOISTERS,
MARINE REPAIRS.

320 ATWATER STREET,
DETROIT, MICH.

After 20.000 miles of almost continuous steaming since going into commission, including her remarkable trip from San Francisco to Key West, the U. S. Gunboat MARIETTA, equipped with Babcock & Wilcox water tube boilers, ordered the following repair parts:

"T. B. S.—W. D. L.

Gentlemen:

NAVY DEPARTMENT,
Bureau of Supplies and Accounts,
Washington, D. C.

In reply refer to No. 29181.

June 10, 1898.

1. Please forward to the Commanding Officer, U. S. S. 'MARIETTA', Key West, Fla., 8 fire bricks, 4 rights and 4 lefts, No. R, 3440, Babcock & Wilcox boilers, to replace broken bricks between furnace doors.
2. Your bill for these articles should be sent to the same officer and should refer to Steam Engineering Requisition dated June 1, 1898.

Respectfully,

THE BABCOCK & WILCOX CO.,
29 Cortlandt St., New York."

(Sig.) EDWIN STEWART, Paymaster General,
U. S. N.

On her long voyage the MARIETTA was not detained an instant on account of boilers.

THE BABCOCK & WILCOX CO., WATER TUBE BOILERS, 29 Cortlandt St., New York.

CLEVELAND CITY FORGE & IRON CO.

CLEVELAND, O.

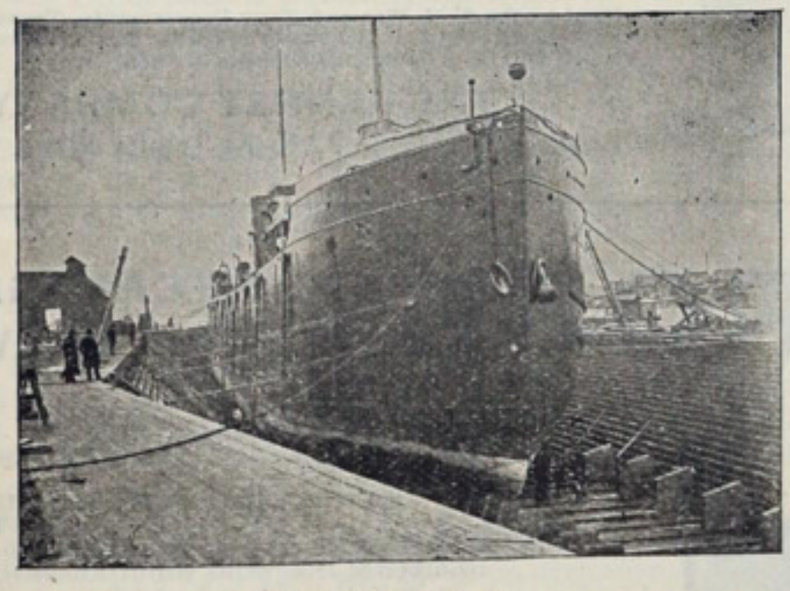
IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT.
COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.

AMERICAN STEEL BARGE CO.

STEEL and METAL SHIPS

Of all classss built on the Shortest Possible Notice at our yards at

West Superior, Wis., and also at Everett, Wash.



Plates & Material Always on hand to Repair all kinds of Metal Ships in Shortest Time.

Best Quality of Oak instock for Repairing Wooden Vessels of all Classes.

SIZE OF DOCK.

Length, extreme	537 feet.	Entrance, Top	55 feet 9 in
Breadth, Top	90 " 4 in.	Entrance, Bottom	50 "
Breadth, Bottom	52 "	Depth over Sills	18 "

LARGEST DRY DOCK ON THE LAKES.

Prices for Repairs and Docking same as at lower lake ports

SUPERIOR, WIS.

A number of Propeller Wheels in stock at Dry Dock.

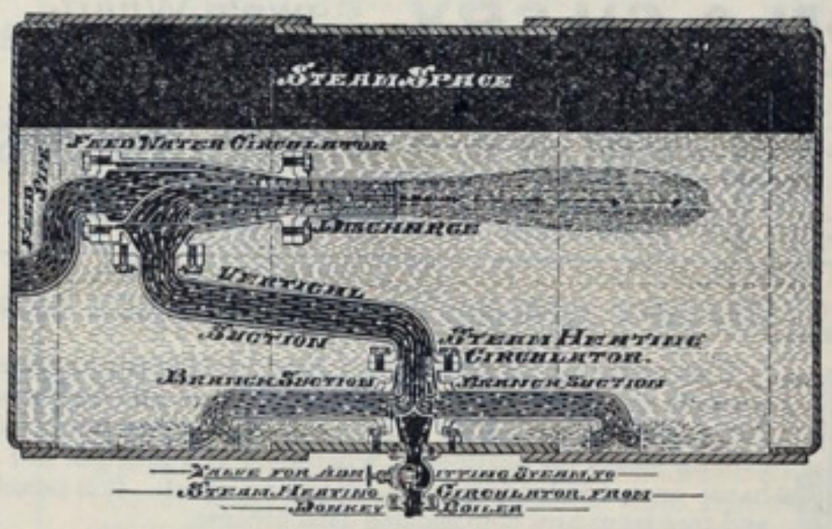
The Donnelly Salvage Wrecking Company Limited.

Experienced Divers. Two Steam Pumps &c. Supplied on Shortest Notice.

Kingston, Ont.

The Equilibrium Circulator and Steam Heating Attachment

FOR HEATING AND CIRCULATING THE WATER IN STEAM BOILERS.



Increases evaporation 5% to 15%.

Will pay for itself in a year with saving in repairs.

Keeps all parts of Boiler at an even temperature.

Has no extra Joints to leak.

Creates a constant automatic circulation as long as boiler is fed.

The Steam Heating Attachment will heat and circulate the water with steam from donkey boiler in a half hour, while fires are being started, and be ready for steam with less straining than slow fires burning twelve hours.

H. BLOOMSBURG & CO., 112 35th Street, NEWPORT NEWS, VA.

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Tugs G. A. TOMLINSON, D. P. HALL and PRODIGY in service at SOUTH CHICAGO at all times.

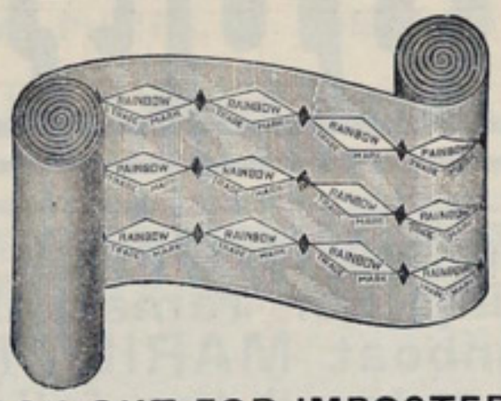
3 long whistles call our tugs. Offices open day and night.

☞ THE INVENTOR OF AND THE ONLY MAN IN THE WORLD WHO CAN MAKE

RAINBOW PACKING.

Thousands of Imitators. No Equal.

Will Hold Highest Pressure.



Don't have to use wire and cloth to hold.

RAINBOW.

Can't blow it out.

LOOK OUT FOR IMPOSTERS.

Commencing December 1st, we use Three Rows of DIAMONDS IN BLACK extending throughout the entire length of each and every roll.

PATENTED AND MANUFACTURED EXCLUSIVELY BY

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THE BOURNE-FULLER CO.

CLEVELAND, O.

BAR IRON. PIG IRON.

BOILER RIVETS. BOILER TUBES. BRACE IRON.
IRON AND STEEL SHEETS. MACHINERY AND TOOL STEEL.
BESSEMER AND OPEN HEARTH STEEL.
SHIP PLATES, BOILER PLATES, SHIP RIVETS.
BEAMS, CHANNELS, ANGLES, BARS, AND OTHER SHAPES.
BILLETS, BLOOMS AND FORGINGS.
"BYERS" FULL WEIGHT WROUGHT IRON PIPE.

WILSON & SILSBY, Rowe's Wharf, BOSTON, MASS.

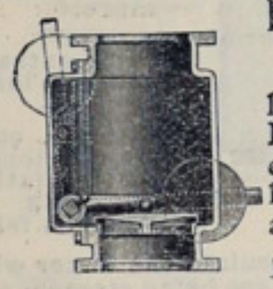
We furnished the Sails for DEFENDER, COLONIA, JUBILEE, NAVAHOE.

PARTICULAR ATTENTION GIVEN TO

SAILS FOR RACING YACHTS.

ALSO THE

OUTFITS OF LARGE STEAM YACHTS.



Excelsior Straight-Way Back Pressure Valve.

This valve has no dash pots, springs, guides or complicated levers to get out of order. It is simple, reliable and well-made. Never sticks, and can be relied upon at all times when using exhaust steam for heating; or when used as a relief, or free exhaust on a condensing plant, it has no equal. It is noiseless and free from any complicated attachments.

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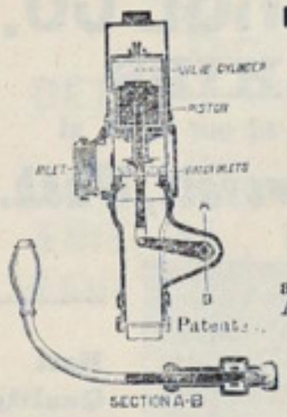
THE KENNEY FLUSHOMETER

FOR FLUSHING WATER-CLOSETS.



An Appliance that takes the place of the noisy and dirty overhead flush-tank.

THE BEST SYSTEM EVER INVENTED FOR USE ON STEAM VESSELS.

Owners and Constructors of Steamships, Yachts and Steamboats have found it indispensable.

Used by the U. S. War and Navy Departments—Transports Mohawk and Massachusetts. U. S. Cruiser Detroit. U. S. Gunboat Amphitrite. Also Albany Day Line Steamers, and others.

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Catalogue? 72 to 74 Trinity Place, NEW YORK.

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REG TRADE MARKS "Phosphor-Bronze" DELTA

THE PHOSPHOR BRONZE SMELTING CO. LIMITED, 2200 WASHINGTON AVE., PHILADELPHIA.
"ELEPHANT BRAND PHOSPHOR-BRONZE"
INGOTS, CASTINGS, WIRE RODS, SHEETS, ETC.
—DELTA METAL—
CASTINGS. STAMPINGS AND FORGINGS,
ORIGINAL AND SOLE MAKERS IN THE U.S.

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THE HEINTZ STEAM TRAP wide open when cold—instantly closes after pipes are blown out and live steam enters the trap. The only trap guaranteed to work perfectly on marine work and under every condition, if properly installed.

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CROSBY STEAM GAGE AND VALVE CO.

CROSBY POP SAFETY VALVES, Locomotive, Marine and Stationary.
CROSBY WATER RELIEF VALVES, for Pumps, Hydrants, etc.
CROSBY IMPROVED STEAM PRESSURE GAGES.
CROSBY STEAM ENGINE INDICATORS, with Sargent's Electrical Attachment for taking any number of Diagrams simultaneously.

The Original SINGLE BELL CHIME WHISTLES.
BRANDEN PUMP VALVES; rubber with wire-coil insertion.
BOSWORTH FEED-WATER REGULATOR, PATENT GAGE TESTER, and many other specialties in Steam Lines.

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